cycles

—A MONTHLY REPORT

April 1952

FOUNDATION FOR THE STUDY OF CYCLES
New York, New York

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cycles
—a monthly report

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VOLUME III NUMBER 4 APRIL 1952

The Director's Letter

Dear Member:

There are four things about which I want to write to you this month.

First, I want to answer several requests asking me to explain why my stock market projection and Mr. Hughey's projection differ. Second, I want to comment upon the present stock market situation. Third, I want to write you about the present business situation. And fourth, I want to finish my reply to Dr. Whitford of New Haven who asked if, in the light of the Korean War and other factors, I would change anything in the book **Cycles—The Science of Prediction.**

Suppose I take up these items in order.

The Dewey vs. the Predix Projections

In referring to the Dewey vs. the Hughey projection, I have in mind, of course, a synthesis which I published in the June 1951 and September 1951 reports and a similar synthesis published by Mr. Vedder Hughey of Coral Gables, Florida, under the pseudonym of Predix.

One important difference between Hughey's projection and mine is the fact that Hughey's synthesis includes two important short-term cycles, both of which he diagrams as going down at the present time, whereas my synthesis contained no cycles less than 4.89 years in length.

Mr. Hughey's synthesis does not contradict mine; it supplements it.

Let me give you an analogy. Suppose I had made a reconnaissance survey of the height of the land above sea level, starting at New York and going westward. I might have discovered that for the first 50 miles the land averaged 50 feet above sea level, that for the next 50 miles it averaged 300 feet above sea level, and so on. This broad picture might be quite correct, but a more detailed survey would show wide variations from the averages. The hills would rise way above the average; the valleys would dip way beneath it.

This analogy applies to the surveys of market cycles made by Hughey and by me. Using only the longer cycles, my synthesis could not possibly be right for short-term moves. It was not designed to be.

A second difference between the two jobs is that mine was strictly preliminary and made for purposes of general reconnaissance only. My job took me only about three months to complete. Hughey, on the other hand, attempted to do a finished job. It took him about two year's time and, in addition, he had the aid of extensive IBM machine calculations.

I have explained time and again that my synthesis was merely a preliminary "mock-up" of some cycles which *might* be present in the stock market and that it was not to be relied upon as a forecast. In fact, I went further and said that the chart was printed "chiefly to show that these other cycles, if they exist, [and I put "if they exist" in bold face type] could badly distort the low of the 9.2-year cycle," which was described in detail in the June 1951 issue.

The ideal 9.2-year cycle is going up at the present time. Thus, if you knew only about the 9.2-year cycle you would be bullish. To counteract any such impression, I published an old synthesis which I had made some years before which showed that other cycles could completely wipe out the effect of the 9.2-year cycle, and might very easily do so in the present instance.

A third difference between Mr. Hughey's work and mine is that in his synthesis he used 19 cycles, whereas I used but 10.

This inclusion of other cycles is bound to make a difference in the projection and would, of course, make Hughey's projection better than mine if the additional cycles are real and continue.

Hughey's synthesis should be better than mine but, as I have said before, neither projection is good enough for a prudent man to follow. Hughey's forecast is, however, worthy of the most serious attention of cycle students because, in my opinion, it is the best job along these lines that has been done to date.

The Stock Market

If the best job that has been done to date is not good enough for a prudent man to follow in the actual purchase and sale of securities, it stands to reason that, as a student of cycles, I can have no very precise knowledge of what is ahead in the stock market. I can, however, call attention to two or three facts that may be of some help at the present juncture.

The most important of these facts is revealed by the chart published on pages 144 and 145 of our April 1951 report which shows actual month by month industrial common stock prices from 1871 through 1950, together with a straight-line trend fitted to the logs of these prices. This trend line is close enough to actual behavior so that one can feel confident that it is reasonably correct.

Two other charts printed in the April 1951 report show the extent by which the actual prices are above or below the trend. The peak values in 1951 were higher above trend than at any previous time in the entire history of the market, with two exceptions. These exceptions were 1872-1874 and 1927-1930 (the 1951 peak just overtopped the peak of March 1937).

I have brought these charts up to date on page 142 of this issue. Reference to that page shows that, if we correct for underlying growth trend, the value for September 1951 remains the crest of the present move, and that the subsequent peak in January 1952 did not penetrate the levels established in September.

It is a truism of cycles that whatever goes up must come down. The more a curve is above its trend line the more probable is its decline. The fact that we are so much above trend at the present time is therefore definitely bearish.

On the other hand, what we know about the cycles that have been present in the market suggests that the coming decline is not likely to be another 1932.

The Present Business Situation

With the stock market higher above trend than ever before except twice, with production at peak levels, with unemployment down 25% from a year ago and down 50% from two years ago, and with commercial and industrial failures fewer than since 1948, we can hardly be said to be having hard times in the early part of 1952.

In view of these facts, it may come as a surprise to some that certain parts of our economy are definitely depressed. A table published by the U.S. News & World Report in the February 15, 1952, issue shows the percentages by which various industries were at that time below the peaks of 1950. Part of this table is printed at the top of the following page.

These declines do not mean we are entering a depression. But they are straws which indicate that if we were not so busy preparing for World War III we might be on the skids for a minor depression at the present time.

I say a "minor" depression because what we now know about cycles suggests that even if there were no war in Korea and no preparation for a big war in the offing, the depression of the early 1950's would not be a major one. You may remember that I have been telling you this consistently for some time now. In this connection I remember particularly my letter of October 1950.

Down from Mid-1950 Peaks of Output
Per Cent Decline

Passenger cars	49.2%
Radio, television	58.9%
Major appliances	37.0%
Furniture	15.4%
Carpets	50.4%
Cement	13.1%
Glass products	25.9%
Cotton textiles	22.3%
Rayon deliveries	29.0%
Wool textiles	32.8%
Shoes	27.1%
Wheat flour	16.4%
Butter	24.7%
Whisky	52.2%
Cigarettes	24.2%
Paperboard	25.4%
Bituminous coal	11.2%
Metal mining	19.2%

Dr. Whitford's Question

All of this leads naturally into a continuation of my answer to the question raised by Dr. Warren Whitford of New Haven, Connecticut. If you read the March report you may remember that Dr. Whitford asked, supposing Mr. Dakin and I were rewriting **Cycles—The Science of Prediction** would we, in the light of the Korean War and other factors, make any changes in what we said in that book.

In an effort to answer Dr. Whitford, I started out with a discussion of the 54-year cycle. In essence, I said that no changes needed to be made in regard to what had been said in **Cycles** about the 54-year cycle but that in the book we had attempted to date it only in respect to average wholesale prices. I went on to say that recent research had indicated that the 54-year cycle in production had a very different timing. The 54-year cycle in production seems to have had its low in the 1930's and to be strongly in an upward phase at the present time.

It thus seems reasonably clear that the depth of the depression in the 1930's was due, in part, to the trough of this cycle in production, as was the depression which was ushered in by the panic of 1873.

Insofar as the 54-year cycle in production is concerned, we might expect another bang-up depression in the 1980's and yet another one in the general neighborhood of 2040.

The implications for the present time are that any depression that might come about, due to cyclic forces or otherwise, would be minimized by the fact that the 54-year cycle in production is now reaching toward a crest in the 1960's.

The new facts which have been learned about the 54-year cycle in production also explain some of the peculiar production trend lines that have been observed. What seems to be a sudden flattening in trend from the 1900's to the 1930's is probably merely the effect of the downward force of the 54-year cycle. We can expect similar behavior from the 1960's to the 1990's but in the meantime, speaking broadly, the upward force of the 54-year cycle, coupled with what may be left of underlying growth trend, should account for an important surge forward, even without war preparation.

The 18 1/3-Year Cycle

The book **Cycles** also dealt with three other cycles which had shown themselves to be important in our economy. Namely, a cycle about 18 1/3 years in length, a cycle about 9 years in length, and a cycle about 3 1/2 years in length.

I cannot think of anything that has been learned about the 18 1/3-year cycle that would make me want to change importantly anything that was said about this cycle in the book. Since the book was written, however, quite a little has been learned about cycles slightly shorter and slightly longer than 18 1/3 years. You might easily mistake these other cycles for the 18 1/3-year cycle if you were not careful.

One of these cycles seems to be quite close to 17 3/4 years in length. It has been found in many phenomena. The other cycle has as yet been found only in railroad stock prices. It averages 19.4 years in length. However, this longer cycle on its part could easily be a compound of two cycles.

The 19.4-year cycle will have to be isolated in some long series of figures, such as tree rings, before we will know much about it.

The 18 1/3-year cycle in real estate construction was badly distorted during and after the last war, but it is beginning to get back on the track.

The 9-Year Cycle

The 9-year cycle continues to seem as important as it did in 1944, but it may not be quite as simple as it seemed at that time. As Mr. Dakin and I indicated in **Cycles**, in some series of figures this cycle seems to be 9 1/3 years in length, in other series 9 1/5 years in length and in others, 9 years. Are there three separate cycles of the indicated lengths or are they all part of the same cycle, or combination of cycles? We do not yet know.

Work now being done on pig iron prices from 1784 to date shows that the 9-year cycle in those prices reverses phase—that is, turns upside down—as we go backward from the 1830's. Does this mean that this cycle is a compound cycle, or is there some other explanation? Again, long series of figures are needed to provide the answer.

Perhaps I can sum it all up by saying that although there is almost nothing to change in what we said about this cycle, and but little of a definite nature to add to what we said in **Cycles**, there are hints of many additional things that should be known before we have a clear understanding of the 9-year cyclic behavior.

The 3 1/2-Year Cycle

As far as they went, the comments in regard to the 3 1/2-year cycle in the book **Cycles** were correct. But they did not go far enough. The book pointed out that the 3 1/2-year (41-month cycle) was well-nigh universally present in price and production series, that it had kept on coming true many times after discovery, and that it could not reasonably be the result of chance. All of this is true.

But when the book was written it was not known that the waxing and waning of this cycle indicated that it might be a compound cycle. In other words, that it might be the result of two cyclic forces, one a little shorter and the other a little longer than 41 months.

It is a characteristic of compound cycles that they wax and wane, fade out, and then reappear upside down. The 3 1/2-year or 41-month cycle, in common stock prices at least, did wax, then wane, and since about 1940 has faded out.

If we go backward far enough in common stock prices we find that the 41-month cycle also fades out and, as we go still further backward, we discover that it comes in again upside down.

If this cycle really is compound we should expect it to be coming back in, upside down, at the present time. Part of the rise in stock prices in the last two years could be accounted for by an upside down 41-month cycle which would have been going up from July 1950 and which ideally would have reached its crest in January of 1952.

Summary

In summary, then, the specific facts that were set forth in **Cycles—The Science of Prediction** have almost without exception, been clarified and confirmed by further research, but additional facts, not known at the time Cycles was written, supplement the information given in that book.

Moreover, the Korean War, and more particularly the preparations for World War III, have introduced important factors in the situation which are not cyclic in their nature and which tend to minimize, nullify, or even overwhelm the natural cyclic processes.

Similarly, any important cessation of these war preparations would have a corresponding impact upon the cycles.

All of this is especially true in respect to the longer cycles. The shorter cycles seem to "ride on the back" of such disturbances and to be relatively little affected by them.

Does this answer your question, Dr. Whitford? If not, please write me again and I will try to clear up any remaining questions that you may still have in your mind, or that may have been created by my answer.

Very cordially yours,

Edward R. Dewey

Director

Research

POSSIBLE CYCLES IN RAILROAD STOCK PRICES, 1831-1950

Summary

A comprehensive reconnaissance survey of railroad stock prices, 1831 - 1950, suggests a multitude of cycles, the length and relative importance of which are given in the article.

Railroad stock prices were chosen because this series of figures is long and has the advantage of industrial homogenity.

The task ahead is to examine in detail each of the suggested cycles to see if it is rhythmic, and to determine its various characteristics such as shape, timing, length, and amplitude.

THROUGH the generosity of Stockham Valves and Fittings, Inc. of Birmingham, Alabama, one of our members, who, as a public service, supplied the money, and the Mico Instrument Company of Cambridge, Massachusetts, who, similarly, allowed us to test out one of their newly completed harmonic analyzers, I am able to present to you a reconnaissance survey of the cycles in rail stock prices from 1831 to date.

(We also studied industrial stock prices, 1871 to date, and pig iron prices, 1784 to date. Reports on these two other series will be made to you as soon as the material can be put together.)

Railroad stock prices are particularly important for the student of cycles because they constitute the longest single relatively homogeneous series of stock prices in existence. They now cover a period of 121 years.

In contrast to this coverage, industrial common stock prices extend back only to 1871 and are confused by the fact that new industries with different cyclic patterns, or with the same cyclic patterns coming at slightly different times, are added from year to year.

Of course, the cyclic behavior of railroad stock prices may similarly have changed from time to time in accordance with the varying nature of the railroad industry, but there are reasons to believe that this may not be so.

My observations are that a change in the nature of a business usually does not change the cycle. For example, much now made by the General Electric Company was not even invented back in 1893 when the company started, and yet the orders received by that company show clear evidence of a 6-year cycle, continuously from the beginning. (See an article on this subject in the September 1950 report.)

Whether this continuity of cycle length holds true for railroad stock prices I do not know, but there is certainly a better chance of continuity in such prices than in industrial stock prices.

A chart of railroad stock prices, year by year, from 1831 to date is shown in Fig. 1. This chart is reprinted from our September 1951 report, and brought up to date. You will find the sources and the actual figures on page 143 following.

In railroad stock prices the trend is so distorting that it must be removed as a prelude to cycle analysis. The trend chosen was a 19-year geometric moving average of the values, extended arbitrarily at each end as shown by the broken line in Fig. 1.

A 19-year geometric moving average does not give you the true trend. That cannot be determined until all the cycles are discovered and removed. But it is close enough to the true trend for preliminary purposes.

After the actual prices have been adjusted for trend we get the values shown in Fig. 2. These are the values we ran through the harmonic analyzer to get the results shown in the periodogram plotted herewith as Fig. 3.

Fig. 1.

RAILROAD STOCK PRICES, 1831 - 1951

The solid line shows the course of railroad stock prices for the past six generations. The general trend was upward from 1831 to 1910 and has been generally downward since about that time. This behavior is in contrast to industrial stock prices, the underlying trend of which has been continuously upward.

Note particularly the 19.4-year cycle which can be seen easily by inspection. The 19.4-year cycle does not seem to be present in industrial stock prices, or at least not to an important extent.

The broken line represents a 19-year moving average trend. As a 19-year moving average lacks the first and the last nine values these have been added arbitrarily by a dotted line.

Until later in the analysis we cannot tell whether or not the trend has continued to go down since 1940, or has leveled off.

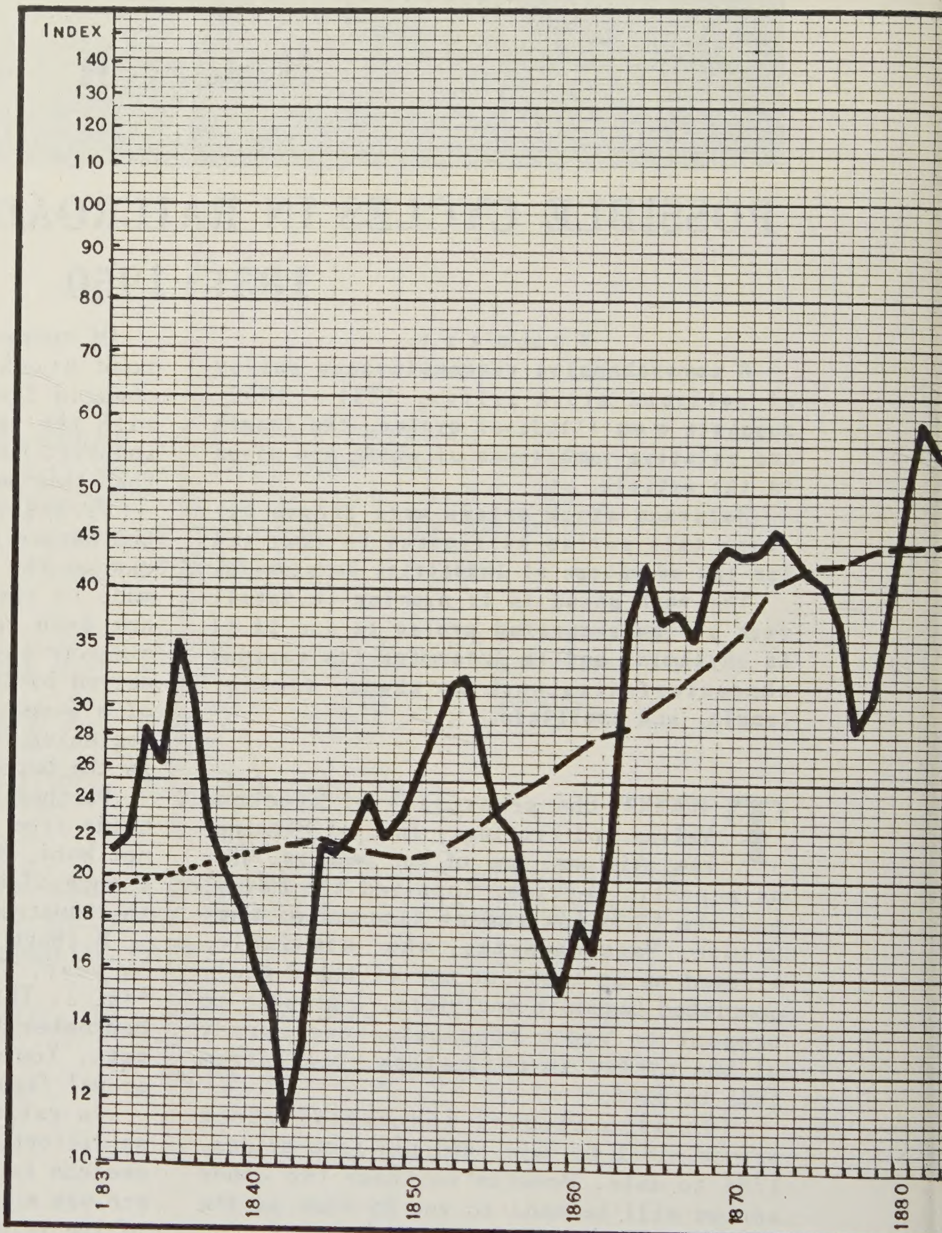
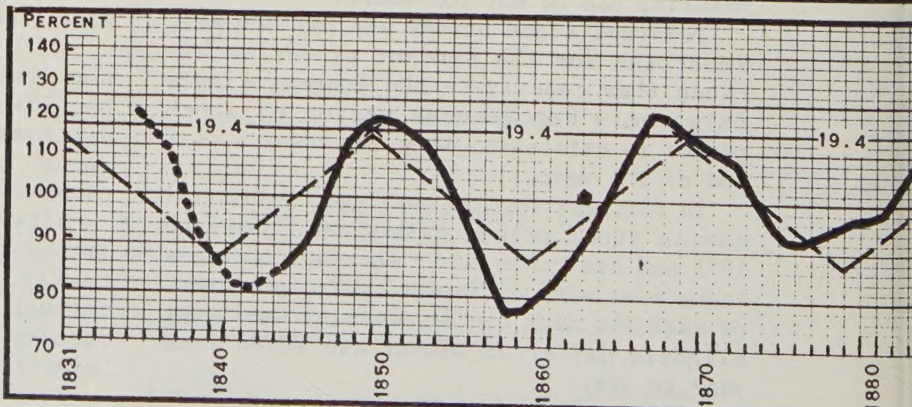
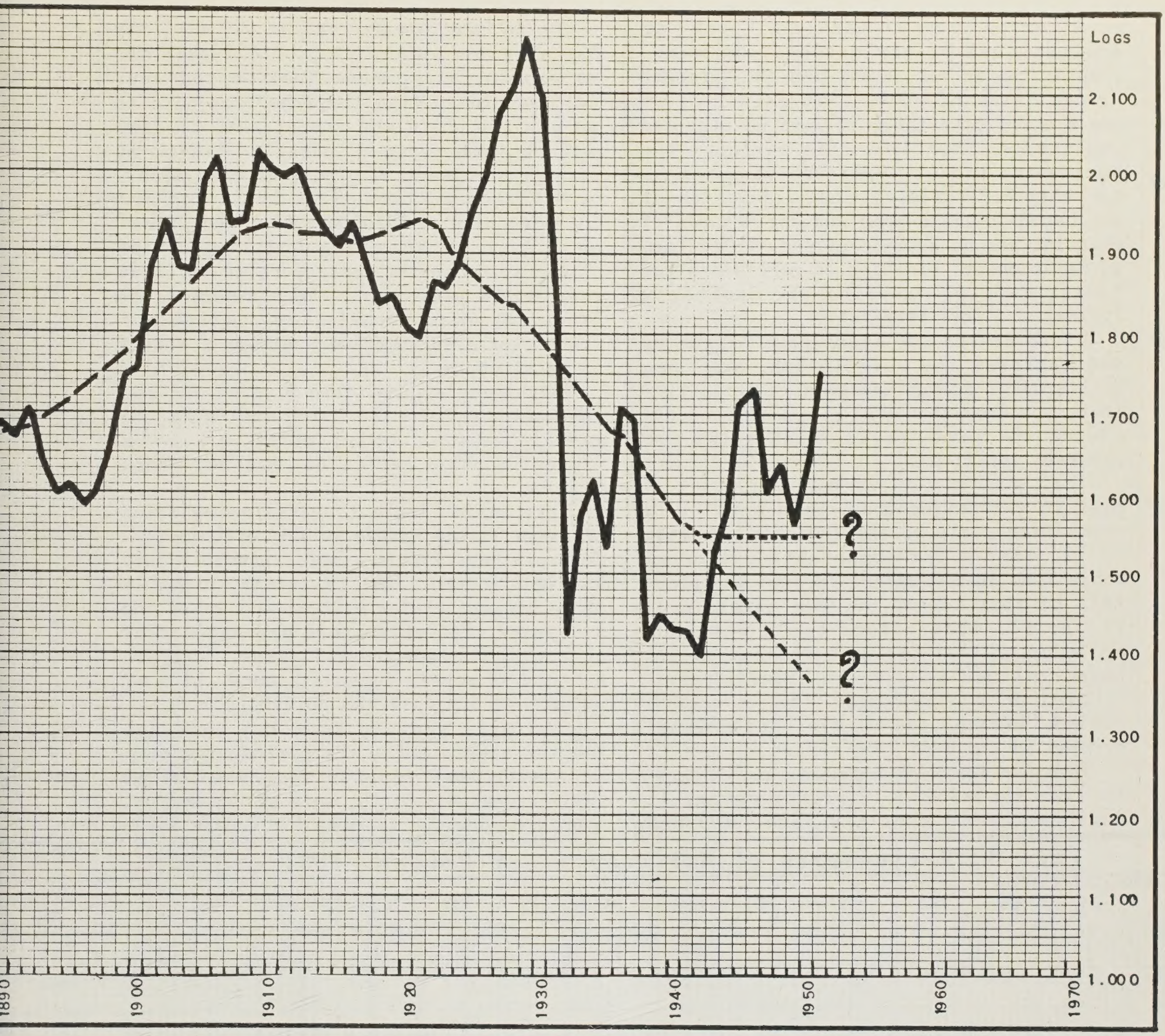


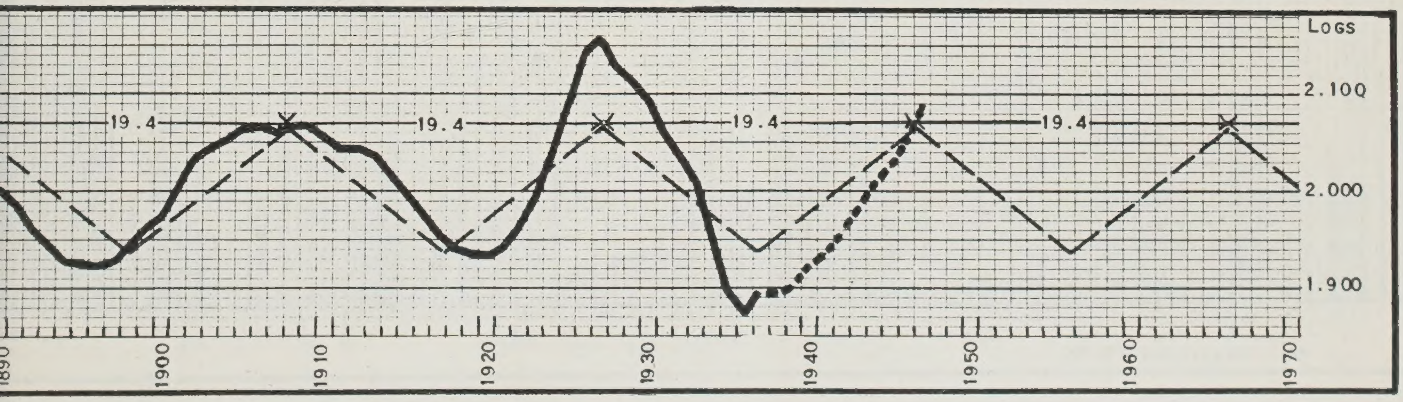
Fig. 2.

This curve shows railroad stock prices as a percentage of trend, smoothed by means of a 9-year moving average. This smoothing eliminates the 9-year cycle also present in these figures, and enables you to see the 19.4-year cycle more clearly.

I have added a series of ideal 19.4-year waves to guide your eye.




Logs
2.100
2.000
1.900
1.800
1.700
1.600
1.500
1.400
1.300
1.200
1.100
1.000
?
?
1890
1900
1910
1920
1930
1940
1950
1960
1970


Logs
2.100
2.000
1.900
19.4
19.4
19.4
19.4
1890
1900
1910
1920
1930
1940
1950
1960
1970

A periodogram is merely a "gram" or writing down of the periods, or wavelengths chosen for study, and the strength or amplitude of each. That is, it gives you a chart of a table of wave lengths and amplitudes. Wave length is given by the horizontal scale. Amplitude is given by the vertical scale. (For a discussion of the harmonic scale used and the methods of charting see an article called "A New Form of Periodogram" starting on page 54 in the Winter 1950-51 issue of the quarterly **Journal of Cycle Research.**

Whenever the amplitude gets bigger as you increase the wave length, and then gets smaller as you increase it still further, you know that there may be a cycle of the wave-length which shows the greatest amplitude.

That word may is very important. A peak in the periodogram could mean (1) a repetitive cycle of the indicated length, or (2) that a few important accidental variations just happened to come at intervals of that length or some multiple of it, or (3) that a real cycle has been split up or that two or more real cycles have combined to give an appearance of strength at a false length. (See an article called "Limitations of the Periodogram" printed in the June 1951 report.)

In other words, a peak in a periodogram is like the wink of a pretty woman. It could mean (1) that she likes you and wants to know you better, or (2) that she has a cinder in her eye, or (3) that she is winking at someone just behind your left shoulder. With the woman you have to go on from there and investigate to find out the true state of affairs. And so it is with the peaks of a periodogram, also.

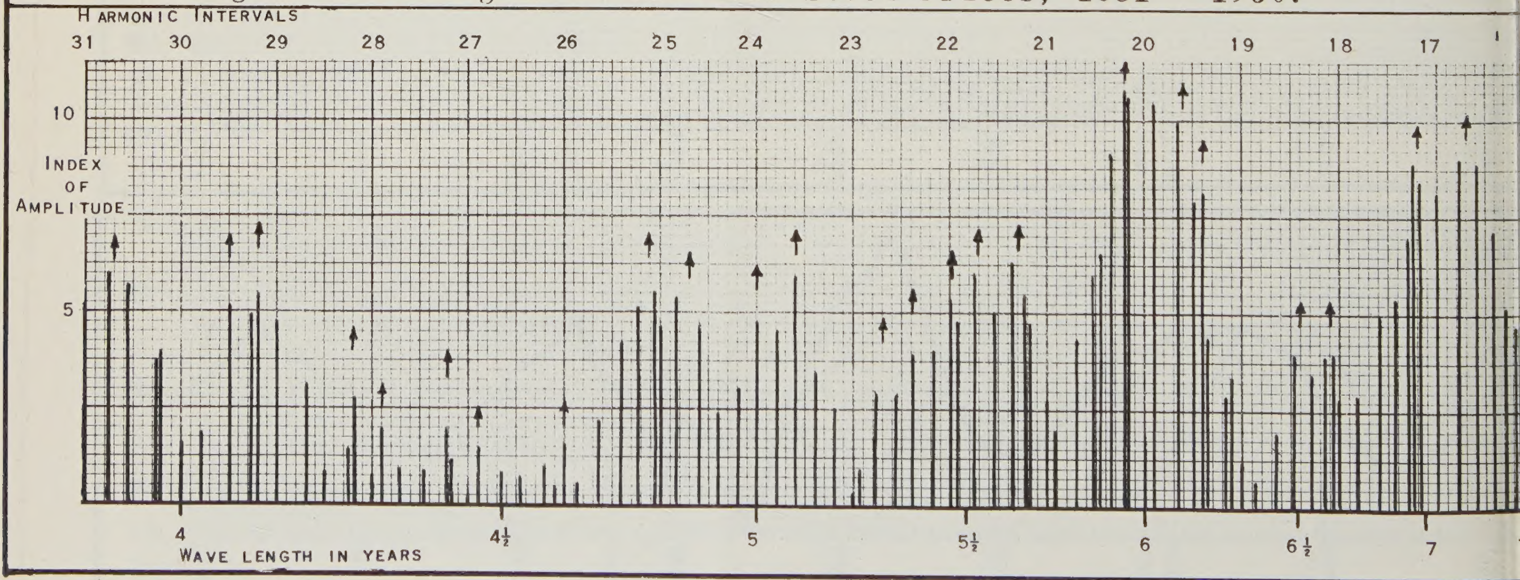
A better analogy might be to compare the peak of a periodogram with the "ping" of an Asdic or submarine detecting device of the sort used by destroyers in the last war. Such a ping may mean a submarine, or it may mean a whale, or a school of fishes, or even sometimes perhaps a vortex of water currents.

With these explanations I print for you the table on page 128 which indicates the wave lengths of cycles, which may be present in this series of railroad stock prices.

This table (Table 1) gives recognition to every little wiggle of the periodogram. Most of these little wiggles probably have no significance. That is to say, probably there are not cycles at both 4.8 years and 4.9 years. Probably there are not cycles at both 5.0 years and 5.1 years. However, as this is merely reconnaissance, it does no harm to indicate the possibility.

You will want to know how the wave lengths suggested by the periodogram compare with wave lengths suggested by my earlier work and by the work of Mr. Hughey. Such a comparison is made for you in Table

Fig. 3. Periodogram of Railroad Stock Prices, 1831 - 1950.



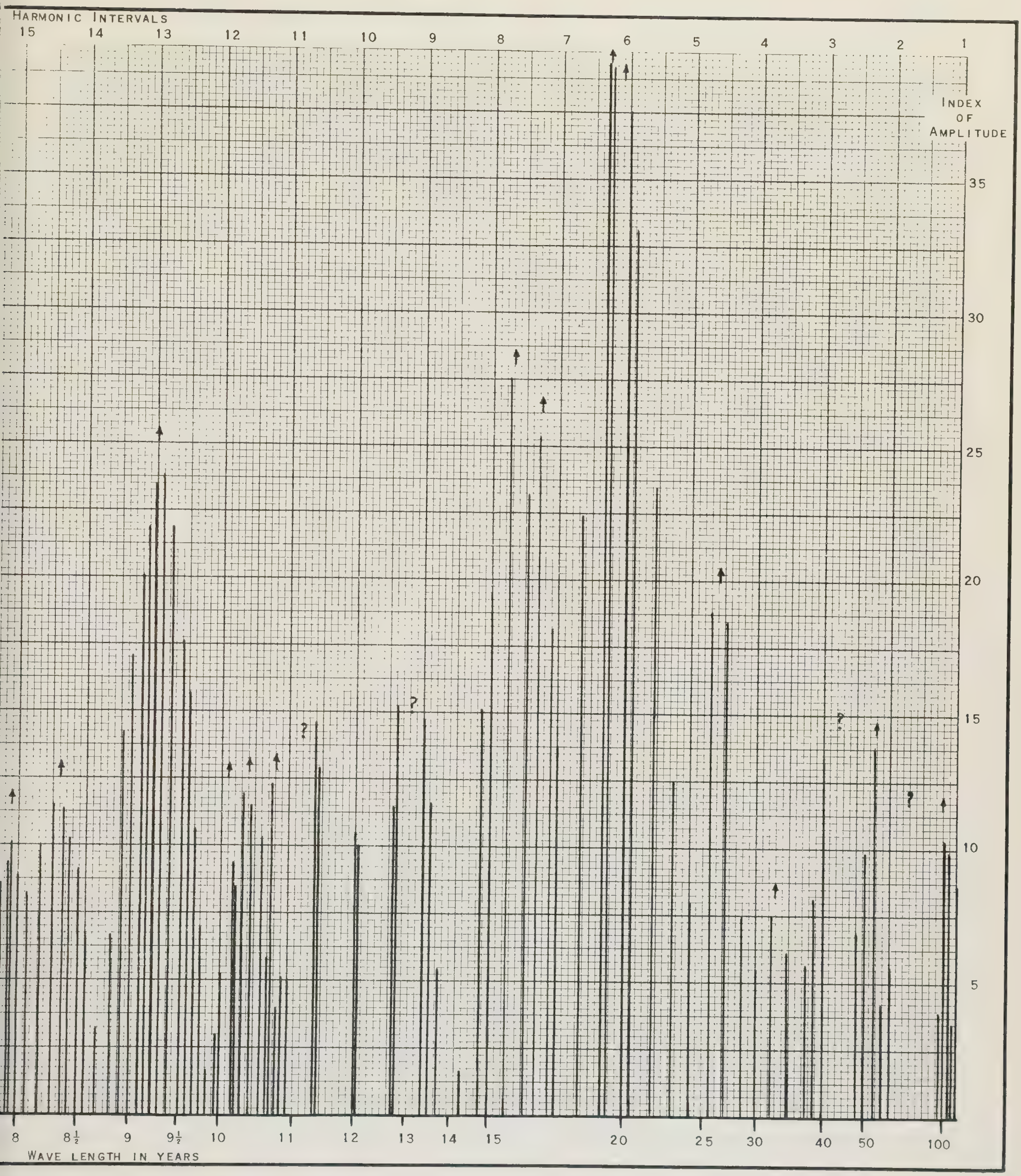

HARMONIC INTERVALS
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
INDEX OF AMPLITUDE
35
30
25
20
15
10
5
?
?
?
?
8
8½
9
9½
10
11
12
13
14
15
20
25
30
40
50
100
WAVE LENGTH IN YEARS

TABLE 1.

Possible Cycles Indicated by Periodogram

Harmonic	Cycle Length in Years	Index of Approximate Amplitude
1.2	100.0	10.2
Between 1.3 & 2.0	Between 92.3 & 60.0	At least 6.0
2.2	54.5	10.0
Between 2.5 & 3.0	Between 48.0 & 40.0	At least 10.0
3.7	32.4	5.0
4.6	26.1	25.0 ?
*6.0 *6.3	*20.0 *19.0	**48.0
*7.3 *7.7	*16.4 *15.6	**37.0
9.0 & 9.4 or	13.3 & 12.8 or	**20.0
Between 9.0 & 9.4	Between 13.3 & 12.8	At least 15.0
Between 10.5 & 11.0	Between 11.4 & 10.9	At least 14.4
*11.2 *11.6 *11.8	*10.7 *10.3 *10.2	**21.5
13.0	9.2	24.5
*14.4 *15.1 *15.4	*8.3 *7.9 *7.8	**21.0
*16.7 *17.2	*7.2 *7.0	**14.0
*18.1 *18.4	*6.6 *6.5	**5.5
*19.4 *19.6 *20.2	*6.2 *6.1 *5.9	**15.7
*21.3 *21.7 *22.0	*5.6 *5.5 *5.4	**12.0
22.4	5.3	SMALL
22.7	5.3	SMALL
*23.6 *24.0	*5.1 *5.0	**7.3
*24.7 *25.1	*4.9 *4.8	**9.0
26.0	4.6	1.0
*26.9 *27.2	*4.5 *4.4	**2.0
*27.9 *28.2	*4.3 *4.2	**2.8
*29.2 *29.5	*4.1 *4.1	**6.9
30.7	3.9	6.0

* Suggestion of multiple cycles

**Combined effect

2. (In this connection, remember that with the exception of the 19.4-year cycle, all of the earlier work was done on combined or mixed or industrial series and that industrials and railroads behave quite differently.)

In some cases, the periodogram tends to confirm the wave lengths suggested by the earlier work. In other cases, the periodogram suggests that the cycles isolated earlier are combinations of cycles of closely related wave lengths. In still other instances, the periodogram suggests additional wave lengths that should be investigated.

If you try to compare the amplitudes given in Table 1 with the amplitudes as shown by the periodogram you will run into a certain amount of trouble because, when the periodogram indicated wave lengths very close to each other, it was necessary to make adjustments to attempt to eliminate the effect of the adjacent cycle or cycles.

Also, you will notice an uneven spacing of the bars of the periodogram, for example for lengths from 11 to 12 years or 12 to 13 years. This irregularity is due to technical difficulties in the operation of the machine that could have been overcome if we had had the time to make the additional runs to fill up these gaps.

You need to be reminded of one other fact. Namely, that deviations from a 19-year moving average minimize all cycles longer than 19 years. It is this fact which largely accounts for the decrease in amplitude as the wave lengths get longer than 19 years.

The next step is to refine the work to determine as nearly as possible the probable reality of each of these cycles, and for those which are real, or seem to be, the exact length, timing, amplitude, and shape.

When all the cycles have been pinned down it is an easy matter to project them into the future and to show their effect for the future, provided of course that they are real and that they continue.

All this we will do for you, step by step, as fast as possible.

TABLE 2.

SUGGESTED WAVE LENGTH - IN YEARS

Dewey's Work	Predix (Hughey's Work)	Harm. Anal.	Dewey's Work	Predix (Hughey's Work)	Harm. Anal.	Dewey's Work	Predix (Hughey's Work	Harm. Anal.	Dewey's Work	Predix (Hughey's Work)	Harm. Anal.
3.8		3.9			5.6		10.0	10.2	19.4	19.5	
		4.1			5.9			10.3			20.0
		4.2	6.1	6.0	6.1		10.7	10.7	21.0		
		4.3			6.2	11.0		Between 10.9 & 11.4		23.3	
		4.4			6.5						26.1
						12.0	12.0				
		4.5			6.6					30.0	
		4.6	6.9					Between 12.8 & 13.3			32.4
		4.8		7.2	7.2		13.5			37.5	
4.9	4.9	4.9		7.7	7.8	14.5					Between 40.0 & 48.0
		5.0			7.9			15.6			
										51.5	
		5.1	8.2				16.0				
											54.5
		5.3			8.3			16.4			
											Between 60.0 & 92.3
		5.4		8.5			18.3				
5.5		5.5						19.0			100.0

THE EFFECT OF ATMOSPHERIC ELECTRICITY UPON BUSINESS

By Ellsworth Huntington

Professor Huntington of Yale University, until his death a member of the Committee of the Foundation for the Study of Cycles, believed that cycles in human affairs might be caused by variations in atmospheric electricity.

Quoted below are some extracts from an article by him which was printed in the December 1944 issue of The Frontier, **a magazine published by the Armour Research Foundation, affiliated with the Illinois Institute of Technology.**

"...variations in the solar constant and in prices on the stock market may be closely connected by way of a cycle of 41-months in atmospheric electricity... Fig. 2 shows the variations of atmospheric electricity from hour to hour.

".....The dots at the top indicate the dates of maxima in the curve of stock prices. Except in 1919 when World War I had disrupted matters, these maxima occur systematically at an interval of from three to twelve months after the maxima of electrical variability. This is about the kind of lag that would be expected if a physical cause leads to human reactions which influence the general trend of prices. Hence we are led to the hypothesis that when atmospheric electricity varies greatly, man's nervous system is stimulated and a feeling of optimism and courage is aroused. This makes people especially ready to take risks, negotiate loans, buy stocks, and start new businesses. When atmospheric electricity falls into a stable condition the stimulus is relaxed. Therefore, a more conservative mood prevails and prices drop.

"So far as we can yet see, the important atmospheric factor is not the strength of the electrical charge but its variability. There is always a difference between the electrical charges of the air and the earth, and hence a slight current. The strength of this current varies greatly from hour to hour, and even from moment to moment. It has long been know that slight but frequent electrical variations produce conspicious physiological results. It now looks as though such variations were constantly occurring in the electrical field of the earth and the air, and were producing physiological effects which manifest themselves in psychological reactions. The strength and frequency of these variations appear to be subject to a cycle which is repeated systematically in a period that averages 41 months, and that shows a strong tendency to swing back into full agreement with this cycle no matter how greatly it is disturbed.....

"Such a relation between atmospheric electricity and human reactions is perfectly logical. Studies such as those begun by Adrian and continued by Burr indicate that the human body has its own definite electrical field. If that is the case, variations in the external electrical field must inevitably influence the internal human field. It is likewise obvious that if the electrical field of the sun or of the solar system as a whole undergoes variations, there must be corresponding disturbances in the field of the earth. Thus, there is a logical connection between solar activity, the earth's atmosphere, man's psychological reactions, prices on the stock market, and the ups and downs of business. Thus far this whole matter is avowedly in the stage of an hypothesis. Nevertheless, the hypothesis seems to fit a great number of facts which were previously inexplicable."

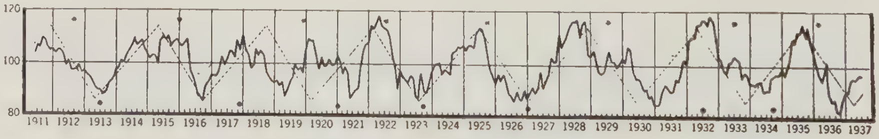


Fig. 2. Variability of atmospheric electricity from hour to hour, 1911 - 1937, together with a perfectly regular 41-month cycle. Dots indicate maxima and minima of stock prices.

CYCLES IN WOMEN'S DRESS FASHIONS

Summary

Women's fashions come in cycles, too. Three basic kinds of dresses follow each other at about 35 year intervals, making the complete cycle about 105 years. We are now in the middle of the "bell" shaped phase. By 1985 we should be in the middle of a period of bustles!

DID you know that there are cycles in women's dress fashions? Well there are. Fashions repeat at about 100-year intervals, or at least they have for as far back as "figures" are available.

There are only three feasible basic designs for women's dresses: tubular, bell shaped, and backsided. These three basic designs are shown in Fig. 1 below.

Studies by Mrs. Agnes Brooks Young of Cleveland show that each of these three basic patterns holds sway for about 35 years, then gradually gives way to the next pattern, and so on, in the order named.

Mrs. Young's scholarly research was published in a book called **Recurring Cycles of Fashion**, printed in 1937 by Harper and Brothers of New York City. This book indicated that, if the cycles of the past continued, we were about to enter a bell shaped era due to last until perhaps 1970, at which time the backsided dresses might be expected to return, to reach their heyday in the 1980's.

Up to date this forecast has been fulfilled.

Excerpts from Mrs. Young's book, including some silhouettes and a series of detailed plates showing fashions year by year from 1760 through 1936, were published by the Foundation as Reprint No. 28.

Here (on page 133) are some of Mrs. Young's silhouettes (plus one for 1950 added by our own talented Mrs. Malinowski), and a few paragraphs in Mrs. Young's own words:

"Each of the cycles which are characterized by the shapes and contours of the skirts appears to last about a third of a century, and since there are only three of them, each basic fashion reappears at intervals of a hundred years. If we had a full series of small photographs, each representing the most nearly typical dress of a single year, and if we should arrange them in chronological order on a series of tables, we should see that this is true. Such a year-by-year arrangement of the illustrations of annual fashions from 1760 through 1937 is to be found further on in this book, and there the fact of style reappearances after the lapse of a century may be verified.

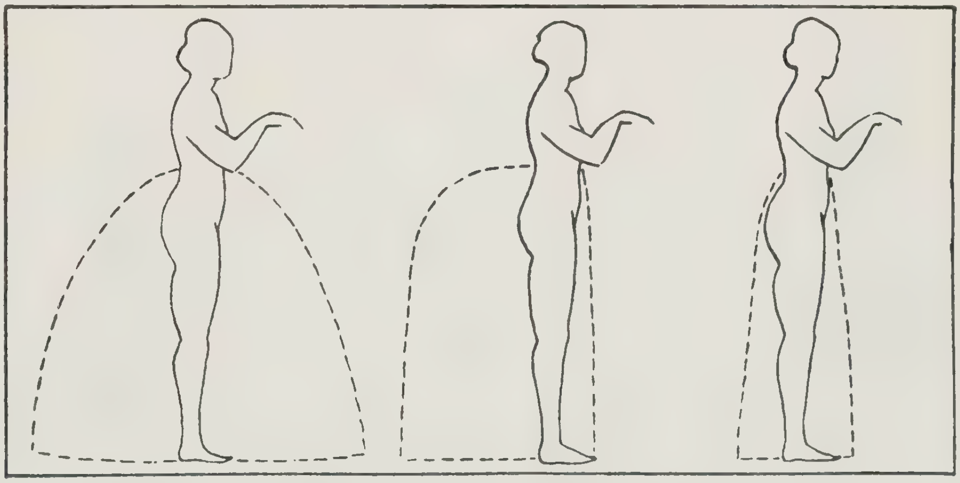


Figure 1. The three fundamental skirt contours.

"The first back-fullness cycle lasted from 1760 through 1795, or 36 years, when it gave way to a tubular cycle which persisted from 1796 through 1829, or 34 years. That was followed by the bell, or so-called hoop-skirt cycle, which continued from 1830 through 1867, or a period of 38 years. Thus, the three cycles brought us through our Civil War period, to a time just a little more than one hundred years from the beginning of our first back-fullness cycle in 1760. Then, in 1868 a new back-fullness cycle started, and we recall it as a period when bustles were in use. It lasted through 1899, or for 32 years, and was followed by the tubular cycle which has lasted up to the present time [1937]. The earlier tubular cycle began in 1796, or 104 years before this one.

"The approximate regularity in the duration of the fashion cycles is truly impressive. In the century and three-quarters under review the cycles have been as follows:

Back-fullness, 1760 through 1795, or 36 years

Tubular, 1796 through 1829, or 34 years

Bell, 1830 through 1867, or 38 years

Back-fullness, 1868 through 1899, or 32 years

Tubular, 1900 through 1937, or 38 years so far.

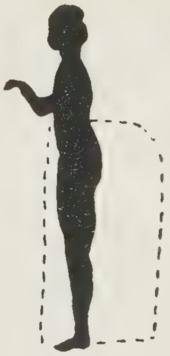
"One cannot but be hesitant in attempting to interpret such an astonishing set of dates and data. Here are carefully selected illustrations of typical fashions, year by year, for 178 years. They are so continuously changing that each typical fashion differs visibly from those that precede and those that follow it. This never-ending change is perhaps the most important single fact about the modern dress of women. And yet the illustrations, the dates, and the figures for the duration of cycles seem to indicate that the ceaseless changes are in reality confined within a framework of almost ironbound rigidity.

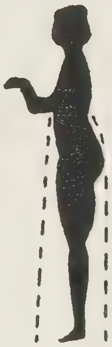
"The relatively uniform duration of the cycles, and the definiteness with which they may be identified by using the classifications here adopted, do not mean that there are no zones of doubt at the end of one cycle and the beginning of the next. The fact is that each transition does present its doubtful cases. When one of the dominant cycle types is drawing toward its close, and is about to make way for its successor, it begins slowly to lose its characteristic appearance and to assume some of the features of the type which is soon to succeed it. In this way the transitions are made gradually. There is no sharp break, and no exact point at which it is possible to say that all dresses before this are unquestionably of one type, and all coming after it are unquestionably of the succeeding type. Rather, the two types gradually merge in the course of the transition, with the old one reluctantly fading away, and the new one progressively becoming dominant.

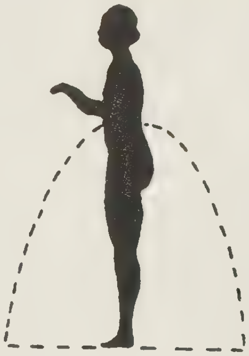
"These transitions are so gradual and smooth that people living through them are seldom aware that anything out of the ordinary is happening. During the transition years, fashion unfolds as steadily, as tranquilly, and even as slowly as at other times, but there is an essential difference in the nature of the change. During the continued dominance of a given cycle type the annual, or normal, change never interferes with the characteristic form and contour of the skirt. The changes are continuous, but they take place within the confines of the established typical silhouette. During transition years, on the other hand, it is the silhouette of the skirt form which succumbs to fundamental change and becomes rapidly modified into the different, succeeding type. . . .

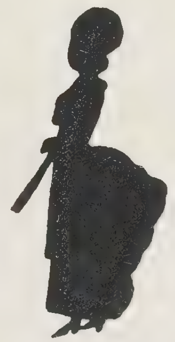
"It has not been found possible to follow the year-by-year typical fashions prior to 1760, but there is fairly convincing evidence that if we could do so, we should have one more of the cycles appearing in its expected place and sequence. There is reasonably good evidence that a cycle of bell-skirted fashions existed from about 1720 or 1725 to 1760. The modes of the period survive in the paintings of Watteau, Boucher, LeClerc and Fragonard, and they are strikingly similar to the hoop-skirt fashions prevailing here and abroad in the years before and during our Civil War.

"If we add this cycle to our previous record, we can lengthen our sequence of

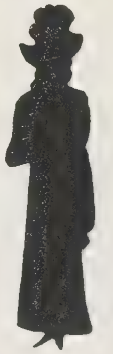




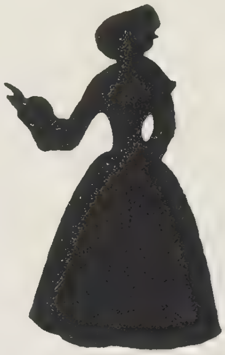




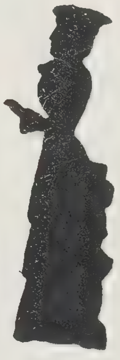
1780



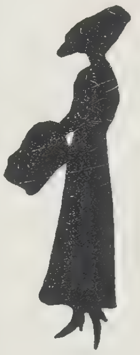
1815



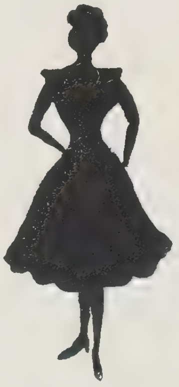
1850



1880



1915



1950

recurring cycles to cover more than two centuries, as follows:

Bell, 1725 through 1759
Back-fullness, 1760 through 1795
Tubular, 1796 through 1829
Bell, 1830 through 1867
Back-fullness, 1868 through 1899
Tubular, 1900 through 1937 so far.

"The regularity of the recurrences is impressively shown by the fact that the second bell cycle appeared 105 years after the first one, the second back-fullness cycle 108 years later than the earlier one, and the second tubular cycle 104 years after its predecessor of the same type. The six cycles of fashion have covered a little more than two centuries of time, and now [1937] one wonders whether or not this present tubular cycle is really about to complete its allotted span, and to be followed by another bell cycle.

"The three cycles and the recurrence of each appear strikingly in the famous exhibition of costumes in the Victoria and Albert Museum in South Kensington. There one may see the actual dresses in display cases arranged chronologically down a long gallery. It is one of the few exhibits of its kind anywhere in the world which are sufficiently extensive to afford a perspective of fashion over any considerable period. The actual costumes are by no means truly typical of the prevailing fashions of their years, but nevertheless they make the evolution of fashion and the dominance of recurring types admirably vivid. Where the original dresses may thus be seen, rather than pictures and fashion plates representing them, it becomes evident that the great bell skirts of the middle 18th Century period were almost literally duplicated by the hoop skirts of our Civil War time; that the back-fullness dresses worn in the period following our Revolutionary War were again in fashion a century later; and, finally, that the reason why the present fashions are so often referred to as the Regency fashions is because of their marked similarity to those that prevailed in the time of George IV, who was regent of England from 1811 to 1830.

"Whether or not the sequence of the recurring types that has remained unchanged in the past will be maintained in the future, no one can tell. We are even now [1937] at a time when the tubular cycle should shortly, according to precedent, be replaced by another type. If the old order is maintained, we should in time have bell skirts once more."

And we did!

THE 11.2-YEAR CYCLE IN INTERNATIONAL WAR

Summary

For as far back as the figures have been studied, international battles act as if they were influenced by cyclic forces. One of these forces seems to have a wave length of 22 1/7 years. Another seems to have a wave length of 11.2 years. Other cyclic tendencies are also observable. They will be reported upon later.

Normal behavior for both the 22 year cycle and the concurrent 11-year cycle call for less than the average number of international battles from now until about 1957.

However, distortions from typical behavior have been frequent. We therefore cannot be sure that a major war will not break out sooner. On the other hand, if five years of peace are granted us, we must not be lulled by that fact into a false sense of security. Unless all history is as naught, sooner or later an avalanche of international battles will engulf us. Let us be ready!

IF you were a member of the Foundation at the beginning of last year you may remember some studies I made for you in regard to cycles in war. These studies were based on a year-by-year index of international battles from 600 B.C. to date which had been prepared by Professor Raymond H. Wheeler.

The last few years of the index, 1750 to 1950 inclusive, are charted below as Fig. 1.

(In additions to the International Battle Index covering the period from 600 B.C. to date, Professor Wheeler also prepared a Civil War Battle Index for the same span of 2550 years. Both of these indexes, and a series of charts to illustrate them, were published in full in our February 1951 report.)

A 57-Year Cycle

In our January 1951 report I showed you that for the 200 years from 1750 to date the International Battle Index had showed an underlying cycle of 57-years in length. Two hundred years is not very much to go on for a cycle as long as 57 years, but at the time Professor Wheeler had not yet published his earlier figures; we had nothing longer than 200 years with which to work. When I have the time I would like to study the entire series of 2550 years to see if this 57-year cycle continued.

A 22 1/7-Year Cycle

In the February 1951 report I showed you that from 1400 A.D. to date the dominant cycle of international war had a length of 22 1/7 years.

The regularity with which a cycle of this length repeated itself time after time is quite dramatic; also, with time for 24 repetitions, the case for a cycle of this length is quite convincing, too.

You may remember that the projection of the 22 1/7 year cycle showed that "ideal" behavior would call for a less than average number of international battles for the period 1946 - 1957, and a more than average number of international battles for the 11 years to follow. Although actual behavior is often at variance with the ideal, in the present instance that is exactly what has happened so far, notwithstanding the Korean war.

An 11.2-Year Cycle

Riding on the back, as it were, of the 22-year cycle are other cycles. One of these is a cycle of about 11.2-years in length. In the February report I promised to tell you more about this 11-year cycle at some future time. I have finally caught up with my promise.

Insofar as a perfectly regular 11.2-year tendency governs the picture we are, at the present time, at a period when less than the average number of international battles are to be expected.

Detailed Examination of Figures

Let us look at these cycles in international war in greater detail.

Fig. 2 shows the actual index 1750 to date, plotted on ratio ruling. (As there is no zero on ratio ruling one battle has been added to each year uniformly throughout.) The 22 1/7 year cycle is quite clear even without the 22 1/7 year zigzag which I have added by means of a broken line to aid your eye.

These values, smoothed and adjusted for underlying undulations, are shown in Fig. 3. The smoothing eliminates the 11-year cycle. There are bad distortions from 1750 to 1800, but prior to 1750 the curve gets on the track again as you can see if you refer to the report for February 1951. That report showed that the 22 1/7-year cycle dominates international war back to 1400, but whether it continued prior to that time I have not had time to find out.

So that you can see the 11.2-year cycle more clearly we express the values plotted in Fig. 2 as percentages of an 11-year moving average trend and smooth these percentages by means of a 5-year moving average. The results of this manipulation are plotted in Fig. 4. Seventeen cycles are shown with crests labeled with capital letters and troughs labeled with lower case.

If you look at Figure 4 you will see that the first four waves are excellent. The fifth, (d - E - e), is so badly distorted that one might as well call it missing. The next six waves are good, even though G - g is a little late. The crest at L is early. The next three waves are good. The 16th wave, from 1925 to 1935 (o - P - p) is late. The last wave (p - Q - p) was also distorted. It remains to be seen if the next wave, due to have its low in 1955-6 and to peak in 1960, will get back to normal timing as determined by typical behavior over the entire 200 year period.

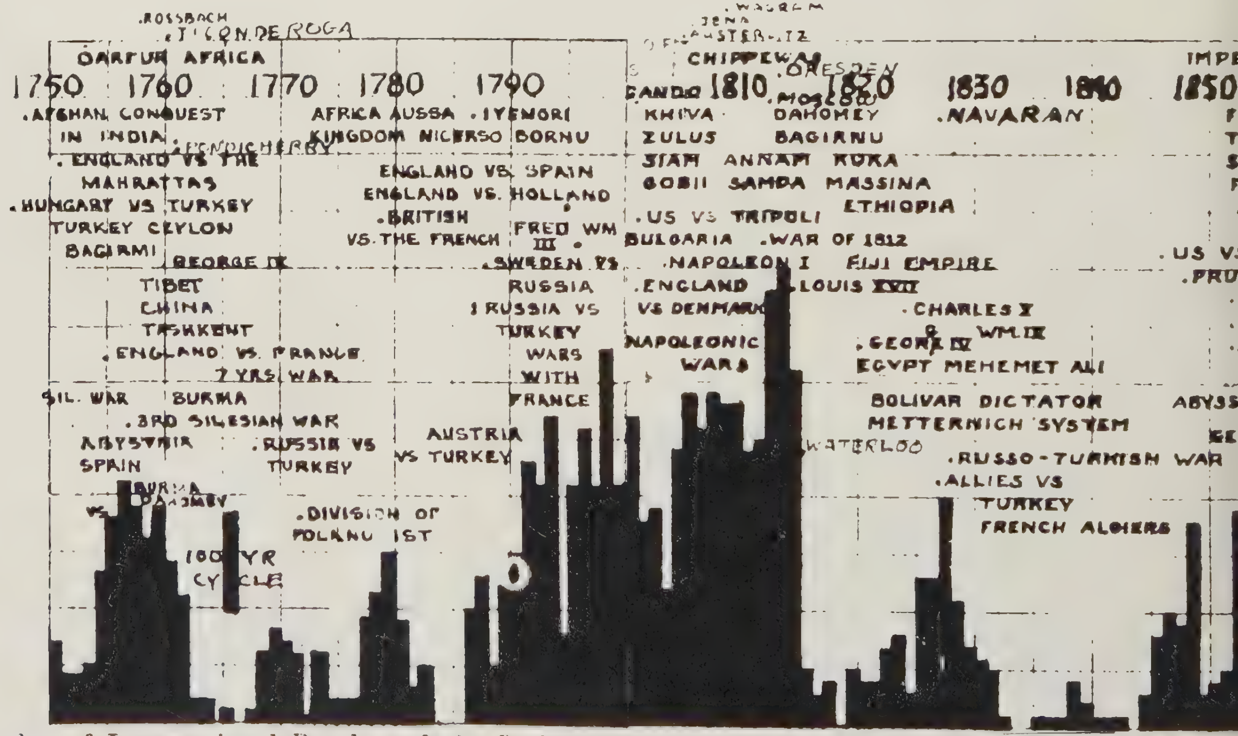


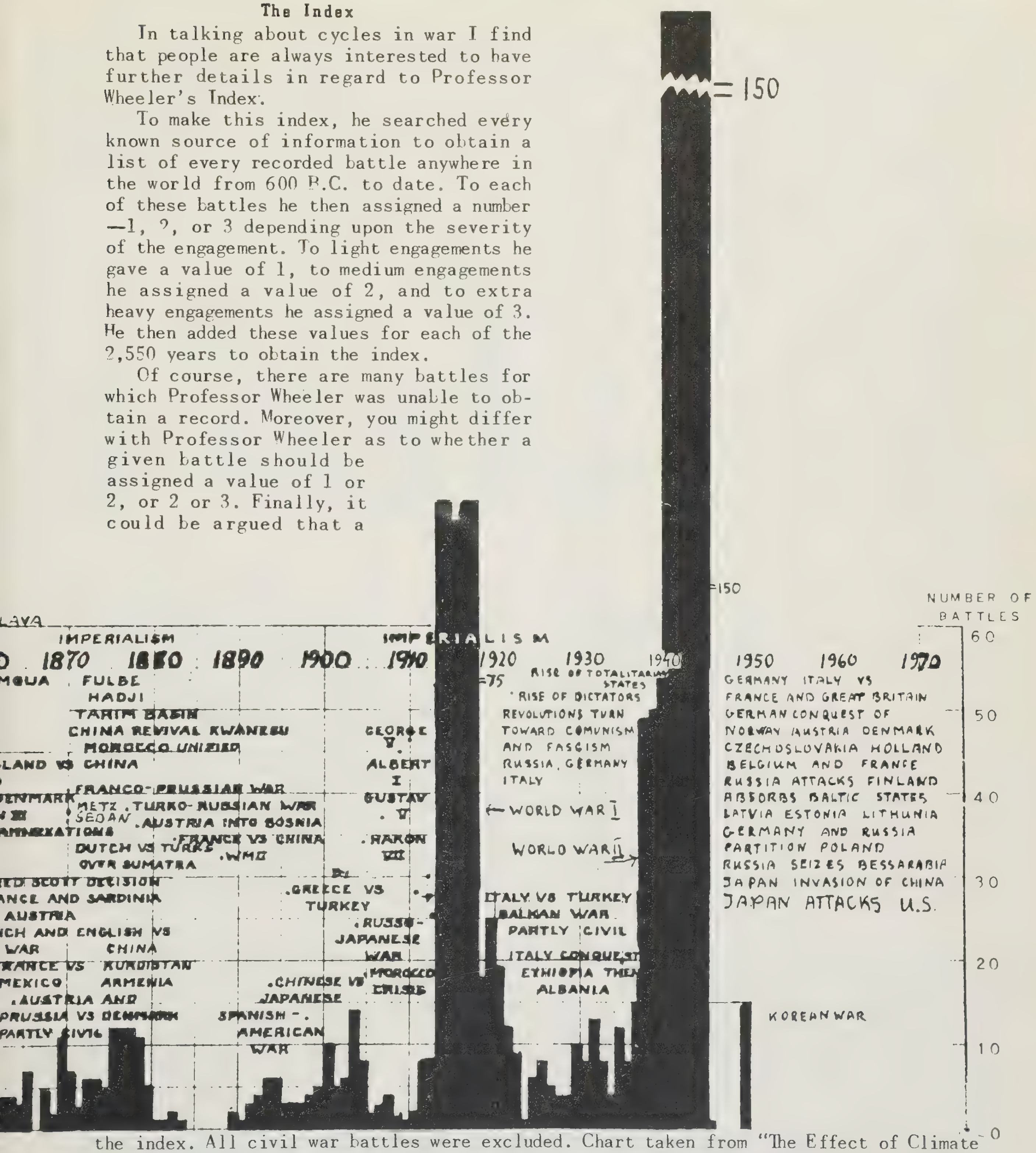
Fig. 1. Index of International Battles of the World, 1751-1950. The index was constructed as follows: A mild international engagement was represented by one point on the index. A moderately severe international engagement was represented by two points on the index, and an exceptionally heavy international engagement was represented by three points on

The Index

In talking about cycles in war I find that people are always interested to have further details in regard to Professor Wheeler's Index.

To make this index, he searched every known source of information to obtain a list of every recorded battle anywhere in the world from 600 B.C. to date. To each of these battles he then assigned a number —1, 2, or 3 depending upon the severity of the engagement. To light engagements he gave a value of 1, to medium engagements he assigned a value of 2, and to extra heavy engagements he assigned a value of 3. He then added these values for each of the 2,550 years to obtain the index.

Of course, there are many battles for which Professor Wheeler was unable to obtain a record. Moreover, you might differ with Professor Wheeler as to whether a given battle should be assigned a value of 1 or 2, or 2 or 3. Finally, it could be argued that a the index. All civil war battles were excluded. Chart taken from "The Effect of Climate on Human Behavior in History," by Professor Raymond H. Wheeler. Professor Wheeler's entire paper is reproduced as Foundation Reprint No. 35, printed as a supplement to the January 1951 report.



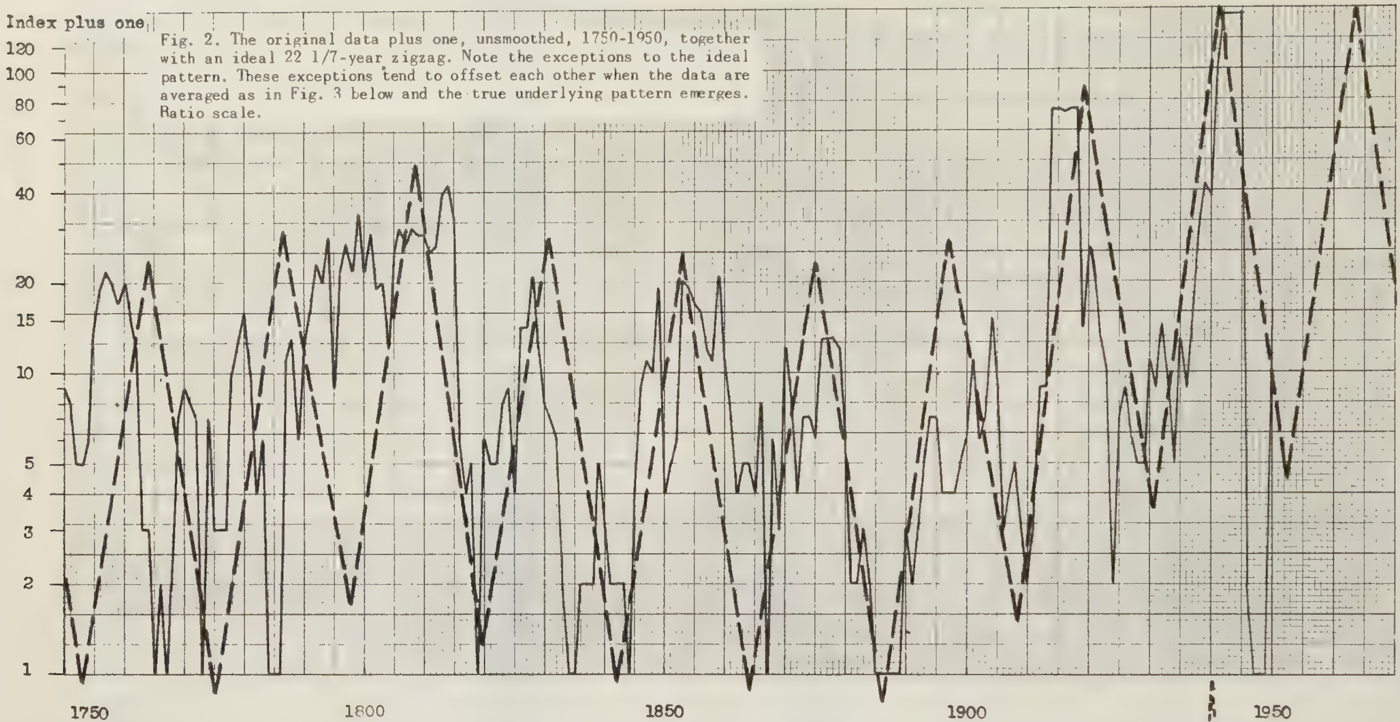


Fig. 2. The original data plus one, unsmoothed, 1750-1950, together with an ideal 22 1/7-year zigzag. Note the exceptions to the ideal pattern. These exceptions tend to offset each other when the data are averaged as in Fig. 3 below and the true underlying pattern emerges. Ratio scale.

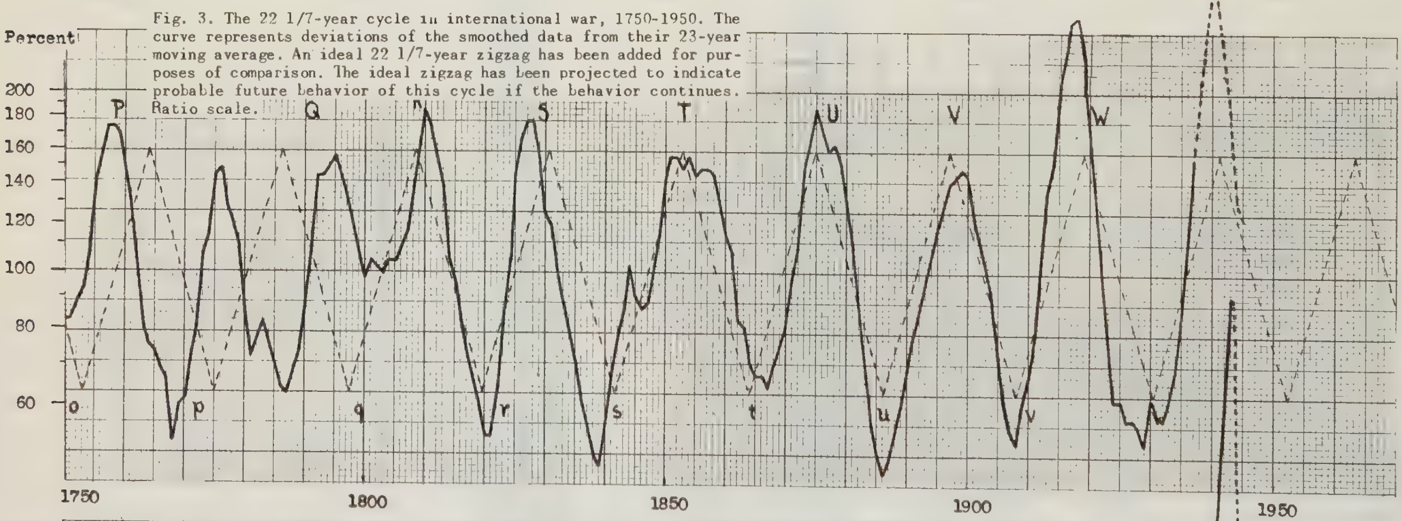


Fig. 3. The 22 1/7-year cycle in international war, 1750-1950. The curve represents deviations of the smoothed data from their 23-year moving average. An ideal 22 1/7-year zigzag has been added for purposes of comparison. The ideal zigzag has been projected to indicate probable future behavior of this cycle if the behavior continues. Ratio scale.

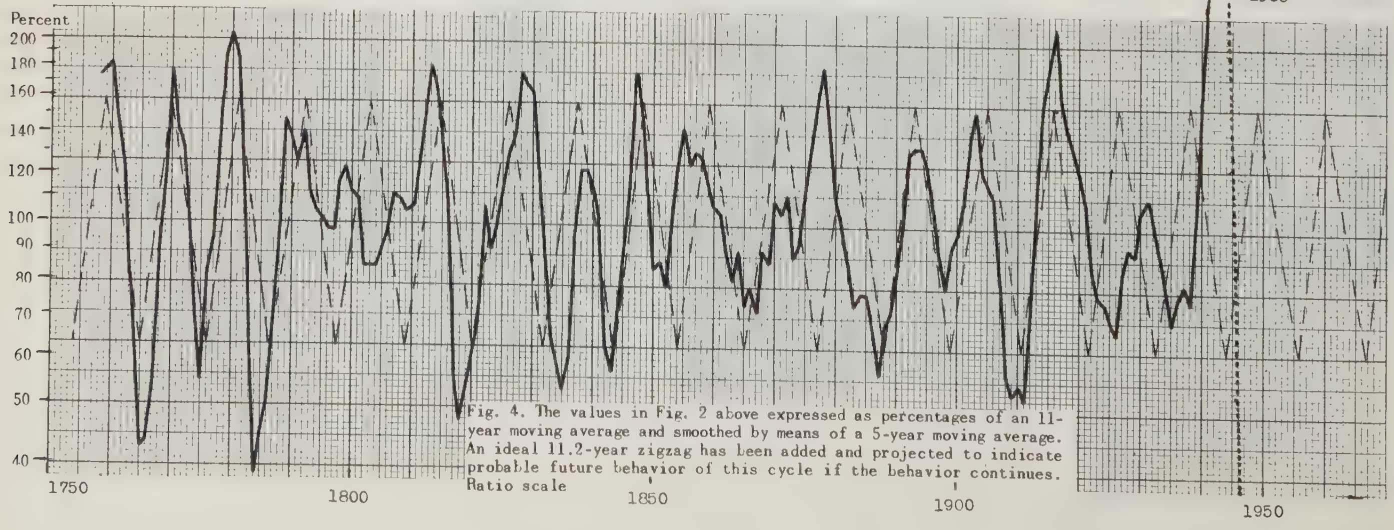


Fig. 4. The values in Fig. 2 above expressed as percentages of an 11-year moving average and smoothed by means of a 5-year moving average. An ideal 11.2-year zigzag has been added and projected to indicate probable future behavior of this cycle if the behavior continues. Ratio scale

modern engagement such as the Battle of the Bulge should be assigned a higher value than some heavy engagement in the Middle Ages.

All these objections to the index are valid. It is perfectly possible that if you were to make your index of international battles, you would come up with a series of values that would differ somewhat from the values determined by Professor Wheeler.

But there are two important facts to take into consideration. One is that you have not prepared an index and Professor Wheeler has. The other fact is that, from the standpoint of cycles, what we are really interested in is the relative intensity of international conflict. For example, in the 1660's were battles relatively more numerous or less numerous than in the 1650's? Your index of international battles might differ in detail from Professor Wheeler's index, but I doubt if it would be any better from the standpoint of revealing the inherent cycles.

Civil War Battles

As I mentioned above, Professor Wheeler also prepared an Index of Civil War Battles from 600 B.C. to date.

No studies have yet been made in regard to the cycles which may or may not be present in civil conflict. However, a cursory comparison between the two indexes shows a rather dramatic tendency for civil war battles to increase as international battles decrease, and vice versa. I therefore imagine that civil war battles will show at least some of the international battle cycles, but upside down.

Cause

If there are significant cycles in the number of international battles, as there seem to be, there must be some underlying cause for this regularity. Professor Wheeler believes the cause to be climatic. That is, he believes that certain sorts of climatic conditions stimulate international conflict; that other sorts of climatic conditions stimulate civil conflict. In brief, Professor Wheeler has noticed that warm periods are associated with international wars and that cold periods are associated with civil wars. However this statement is an oversimplification of a complex situation. If you want to go into the matter I think you had better get hold of Professor Wheeler's paper on the subject, which we published (Foundation Reprint No. 35) as a supplement to the January 1951 report.

As for myself, I have no theories in regard to cause and effect. I feel that the matter of cause ought to be left to the experts in the fields involved, and that as a cycle student I should content myself with trying to discover the facts as to whether or not cycles in the figures really do exist, and, if so, what these cycles are.

Conclusions:

It seems to me these cycles in war are too regular to be the result of chance. If not the result of random forces, which just happen to come at the observed intervals, they have a cause.

The fact that cycles of seemly identical length exist in nature suggests that this cause is environmental.

Without venturing to suggest what this environmental factor may be, we could imagine that it excites people in the mass and that this excitation is reflected in an increase in international war.

If this conjecture is correct it suggests a new approach to the understanding and prevention of war.

In the mean time, until wars are understood and prevented, a knowledge of the inherent cycles provides information of some forecasting value.

For what it may be worth, this information is encouraging at the present time. But exceptions have been too numerous to justify us in relaxing our guard or our preparations. To the contrary, the information disclosed should convince us of the inevitability of war, sooner or later, and should steel us for the long pull.

Finally, you must realize that the findings refer to the increase and decrease in the number of international battles, not to the outbreak of wars. A war could start, you know, quite a while before the peak in the number of battles.

Technical

TECHNIQUES INVOLVED IN THE CONSTRUCTION OF THE PERIODOGRAM OF RAILROAD STOCK PRICES 1831-1950

Using the railroad stock price index of the Foundation for the Study of Cycles (see page 143 of this issue) we proceeded as follows:

1. We converted the values to logs. We did this chiefly because logs are easier to work with.

2. We next computed a 19-year moving average of the logs in order to get an approximation of the trend line.

(The other reason for the use of logs appears at this point. A moving average of the logs gives you a geometric moving average of the data, and a geometric moving average fits the data better than would a simple arithmetic moving average. If we had not used logs our moving average would have been an arithmetic one.)

We chose a moving average trend instead of some other kind of a trend chiefly because you can so easily calculate the effect of a moving average upon cycles of every possible length. Such computations cannot be made easily, if at all, for other curved trend lines.

We chose a 19-year moving average instead of a moving average of some other length because the most important cycle in railroad stock prices has an average length of about 19 years and, therefore, a 19-year moving average gives a smoother trend than any other moving average that might have been selected.

3. We extended the 19-year moving average arbitrarily for the nine years at each end of the series lost by the moving average computations.

4. In order to keep the answers in terms of percentages and to avoid negative logarithms, we added 2.000 to each log of the data. From the sum we then subtracted the logs of the corresponding value of the moving average. The answers gave us the logs of the percentages that the original figures were of the moving average trend.

5. We plotted the result as shown in Fig. 2 on pages 124 and 125.

6. We traced this curve time after time with the stylus of the harmonic analyzer in order to get the sine—cosine values for integral harmonic intervals.

7. We then chopped short sections from each end of the curve to get a shorter over-all length and repeated the process to get sine—cosine values for the integral harmonics of the shorter length which were, on their part, fractional harmonics of the original length.

8. We then computed the square root of the sum of the squares of the sine—cosine values and recorded the result in the periodogram on pages 126 and 127.

TECHNIQUES INVOLVED IN THE DETERMINATION OF THE 11.2-YEAR CYCLE IN THE NUMBER OF INTERNATIONAL BATTLES

The data used were the values given in Foundation Reprint No. 35, which was published as a supplement to our February 1951 report, together with the additional values as computed by Professor Wheeler and recorded on page 57 of our report for February, 1952.

We proceeded with the analysis as follows:

1. Because certain years had no battles and because there is no logarithm for zero we added 1 to each of the values provided by Professor Wheeler. This procedure seemed to be the least distorting of sev-

eral possibilities open to us.

2. We then converted all of these revised values to logs.

3. Then, because we wished to isolate the 11-year cycle (clearly visable by inspection) we computed an 11-year moving average of the logarithms. We did this for the same reason that you usually compute a 12-month moving average when you are calculating a seasonal pattern.

4. In order to keep the result in percentages and to avoid negative logarithms, we added 2.000 to the logs of the value for the various years and subtracted the logs of the moving average. This manipulation gives us a series of logs representing percentages of the 11-year moving average trend; that is, a series of deviations.

5. In order to smooth out minor variations we then computed a 5-year moving average of these deviations.

6. We plotted these smoothed deviations in Fig. 4 on page 138.

7. We then constructed an 11 1/7-year periodic table of these values, averaged the first and second halves of the table separately, and discovered that the slippage between the two halves indicated a length of 11.175, or 11.2.

Data

INDUSTRIAL COMMON STOCK PRICES

IT may be helpful if, at this point, I give you some figures.

First I would like to give you the actual values of the Standard & Poor's Corporation Industrial Stock Index (365 stocks), from January 1951 forward so that you can bring up to date the long term stock market chart shown in the April 1951 report on pages 144 and 145.

I also want to give you the secular (long term) trend values projected month by month through 1951 and 1952.

These values are as follows:

Month	Index	Trend
January 1951	182.6	133.8
February	189.6	134.1
March	184.4	134.4
April	187.3	134.7
May	189.3	135.0
June	186.9	135.3
July	188.1	135.6
August	198.3	135.9
September	205.2	136.3
October	202.3	136.6
November	193.3	136.9
December	199.1	137.2
January 1952	204.0	137.5
February	201.6	137.8
March		138.1
April		138.4
May		138.8
June		139.1
July		139.4
August		139.7
September		140.0
October		140.3
November		140.6
December		141.0

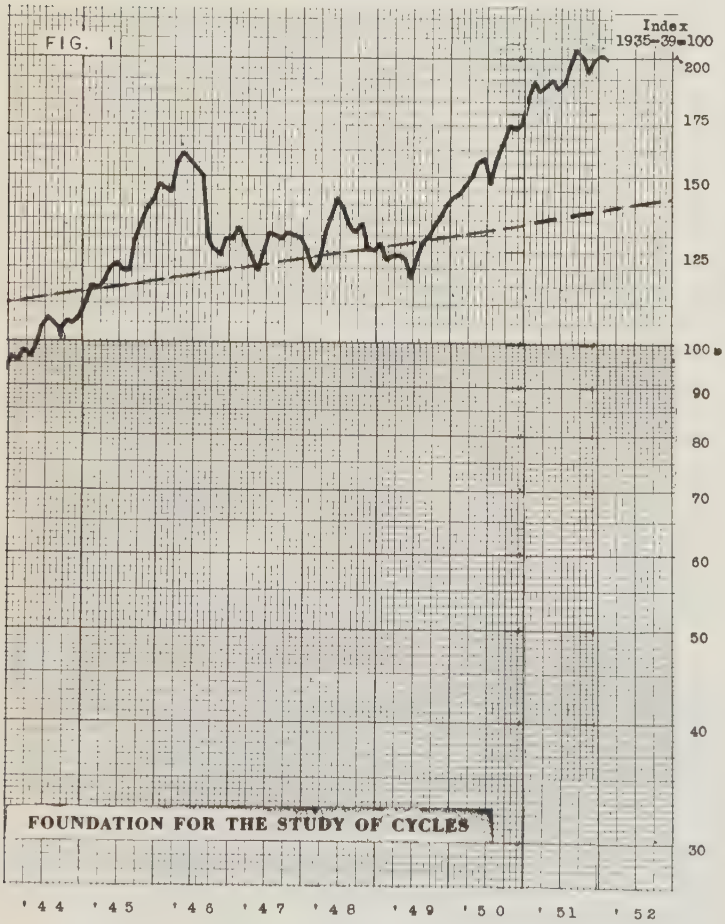
Second, I want to give you the deviations or departures from trend for the same period, and their logarithms, so that you can bring up to date the chart on pages 148 and 149 and the table on pages 146 and 147 of the same issue.

As a matter of fact, I think it would be a good idea if I saved you the trouble and did the charting for you. Why should 1,600 charts have to be made when one chart-making operation will do as well? So, for charts, refer to Fig. 1 and 2.

Month	Deviations (in percent of trend)	Logs of Deviations
January 1951	136.8	2.136
February	141.6	2.151
March	137.4	2.138
April	139.3	2.144
May	140.3	2.147
June	138.4	2.141
July	138.7	2.142
August	145.9	2.164
September	150.7	2.178
October	148.3	2.171
November	141.3	2.150
December	145.2	2.162
January 1952	148.6	2.172
February	146.2	2.165

(March figures are not available as we go to press.)

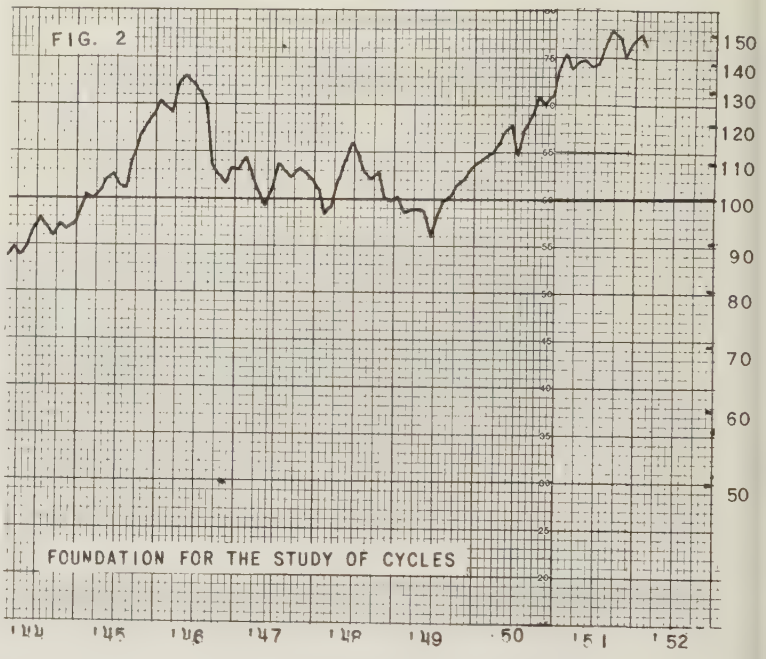
FIG. 1



I would suggest that you refer again to these long term charts in the April issue, and perhaps cut them out as I have done and past them on the wall.

It is extremely important at all times to keep perspective; to know whether or not we are above or below trend, and by how much.

FIG. 2



FOUNDATION FOR THE STUDY OF CYCLES' INDEX OF RAILROAD STOCK PRICES, 1831-1951

TO construct an index of railroad common stock prices suitable for cycle analysis we proceeded as follows:

As the basis of this index we used the following source material: (1) For the period 1831-1870 we used the Cleveland Trust Company Index of Rail Stock Prices; (2) for 1871-1938 we used the Standard and Poor's Corporation Index of Railroad Stock Prices as extended backward by Alfred Cowles III and Associates and published by them as Index P-3 in their book **Common Stock Indexes**; and (3) for the period 1939-1951 we used the Standard and Poor's Corporation Railroad Stock Index as published in the Survey of Current Business.

As the Standard and Poor's Corporation Index is now based on 1935-39=100, but was formerly based on 1926=100, and as the Cleveland Trust Company Index differs from the Cowles Index, adjustments were made as follows:

1831-1870, x 1.149
1871-1938, x 2.643
1939-1951, x 1.000

The values of the new index, thus derived, are given below.

You can keep this index up to date from year to year or month to month or even from week to week from the Survey of Current Business.

TABLE 1

THE FOUNDATION FOR THE STUDY OF CYCLES INDEX OF RAILROAD STOCK PRICES, 1831-1951.

YEAR	INDEX	YEAR	INDEX	YEAR	INDEX	YEAR	INDEX	YEAR	INDEX	YEAR	INDEX
1831	55.8	1851	74.3	1871	115.5	1891	123.2	1911	262.7	1931	191.6
32	57.8	52	83.5	72	121.6	92	134.3	12	265.9	32	69.8
33	75.6	53	85.1	73	116.0	93	114.7	13	238.9	33	99.7
34	69.1	54	69.9	74	109.7	94	104.9	14	222.0	34	109.7
35	93.0	55	61.4	75	106.5	95	107.6	15	213.8	35	89.9
36	80.3	56	58.7	76	97.3	96	101.2	16	229.7	36	135.3
37	60.3	57	48.9	77	74.8	97	106.0	17	201.7	37	130.3
38	53.2	58	44.4	78	81.1	98	119.2	18	181.6	38	69.0
39	48.9	59	40.1	79	100.7	99	147.5	19	185.3	39	74.7
1840	42.1	1860	48.1	1880	130.3	1900	150.9	1920	169.2	1940	71.1
41	39.2	61	44.3	81	157.0	01	202.7	21	163.3	41	70.6
42	29.0	62	56.7	82	147.2	02	230.0	22	192.2	42	66.1
43	36.0	63	97.6	83	141.4	03	200.4	23	190.0	43	88.7
44	57.5	64	112.6	84	118.9	04	199.6	24	202.7	44	101.0
45	55.8	65	96.9	85	114.7	05	258.0	25	236.6	45	136.9
46	59.0	66	100.0	86	134.3	06	275.9	26	264.3	46	143.0
47	64.0	67	93.5	87	138.5	07	227.6	27	314.8	47	105.3
48	57.8	68	111.5	88	127.9	08	228.4	28	339.6	48	114.8
49	60.8	69	117.2	89	127.2	09	281.8	29	389.3	49	96.6
1850	67.0	1870	115.3	1890	127.9	1910	266.4	1930	330.1	1950	116.7
										51	148.8

TABLE 2

DEVIATIONS OF THE LOGS OF THE INDEX OF RAILROAD STOCK PRICES (SHOWN IN TABLE 1 ABOVE)

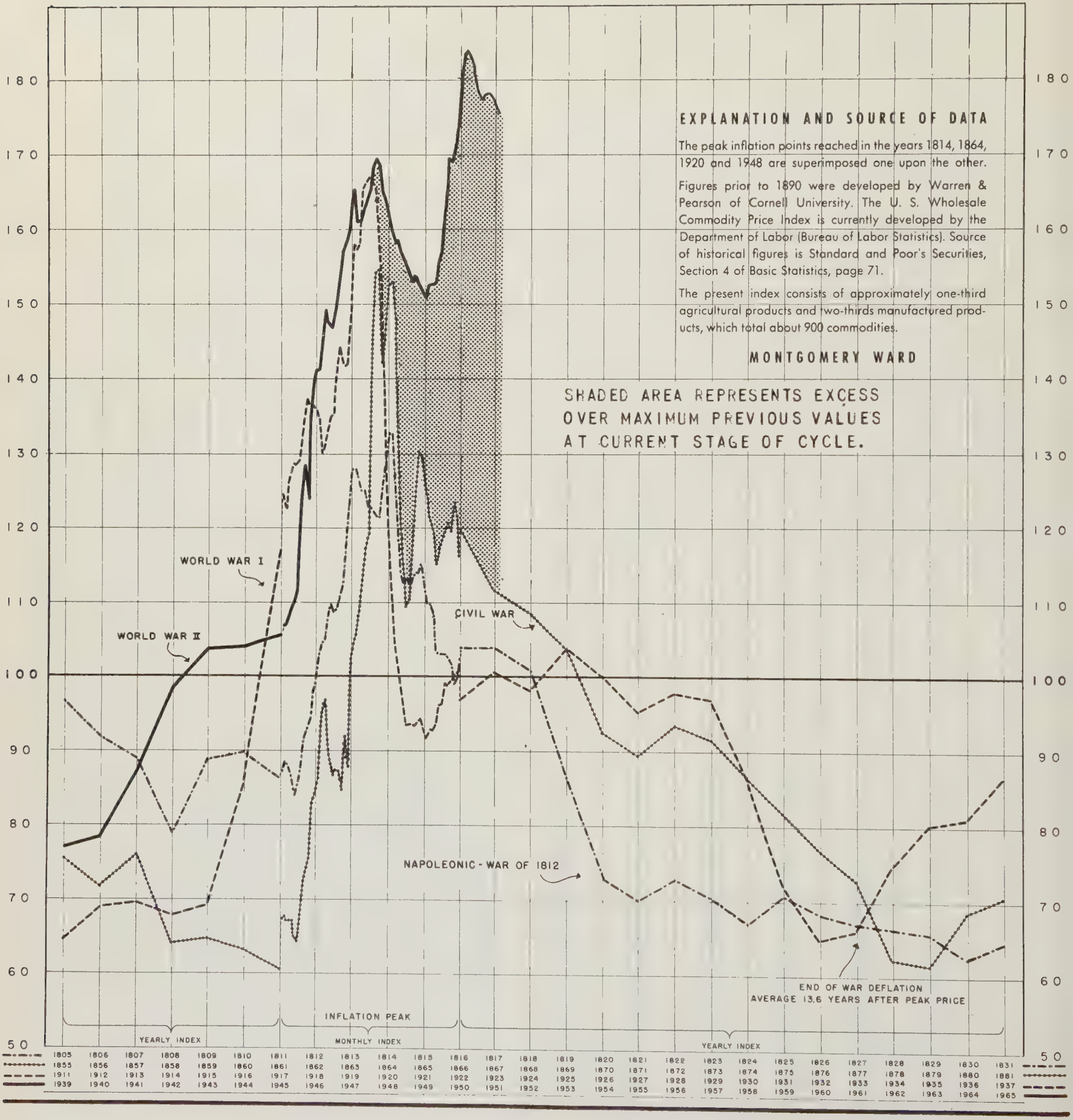
FROM THEIR 19-YEAR MOVING AVERAGE

YEAR	LOGS	YEAR	LOGS	YEAR	LOGS	YEAR	LOGS	YEAR	LOGS	YEAR	LOGS
1831	*2.039	1851	2.123	1871	2.057	1891	1.994	1911	2.065	1931	2.086
32	*2.050	52	2.164	72	2.057	92	2.025	12	2.079	32	1.671
33	*2.161	53	2.162	73	2.026	93	1.945	13	2.033	33	1.849
34	*2.118	54	2.065	74	1.997	94	1.895	14	2.002	34	1.910
35	*2.244	55	1.991	75	1.979	95	1.893	15	1.991	35	1.842
36	*2.175	56	1.960	76	1.937	96	1.851	16	2.026	36	2.035
37	*2.047	57	1.871	77	1.815	97	1.855	17	1.966	37	2.037
38	*1.986	58	1.818	78	1.845	98	1.893	18	1.913	38	1.788
39	*1.946	59	1.761	79	1.937	99	1.973	19	1.918	39	1.849
1840	1.878	1860	1.826	1880	2.047	1900	1.965	1920	1.869	1940	1.857
41	1.843	61	1.779	81	2.125	01	2.075	21	1.849	41	1.865
42	1.708	62	1.879	82	2.097	02	2.115	22	1.927	42	1.819
43	1.799	63	2.108	83	2.076	03	2.035	23	1.951	43	*1.977
44	1.996	64	2.158	84	2.000	04	2.015	24	1.997	44	*2.033
45	1.991	65	2.081	85	1.984	05	2.109	25	2.079	45	*2.165
46	2.021	66	2.079	86	2.051	06	2.122	26	2.149	46	*2.184
47	2.057	67	2.036	87	2.057	07	2.020	27	2.234	47	*2.051
48	2.015	68	2.100	88	2.017	08	2.010	28	2.274	48	*2.088
49	2.039	69	2.106	89	2.010	09	2.097	29	2.356	49	*2.013
1850	2.083	1870	2.081	1890	2.010	1910	2.067	1930	2.304	1950	*2.096
										51	*2.202

* FROM THE ARBITRARY EXTRAPOLATED VALUES PLOTTED IN FIG. 1, PAGES 124/25

U. S. WHOLESALE COMMODITY PRICE INDEX
MAJOR WAR PERIODS

U. S. BUREAU OF LABOR STATISTICS • 1926=100 • ALL COMMODITY



EXPLANATION AND SOURCE OF DATA

The peak inflation points reached in the years 1814, 1864, 1920 and 1948 are superimposed one upon the other.

Figures prior to 1890 were developed by Warren & Pearson of Cornell University. The U. S. Wholesale Commodity Price Index is currently developed by the Department of Labor (Bureau of Labor Statistics). Source of historical figures is Standard and Poor's Securities, Section 4 of Basic Statistics, page 71.

The present index consists of approximately one-third agricultural products and two-thirds manufactured products, which total about 900 commodities.

MONTGOMERY WARD

SHADED AREA REPRESENTS EXCESS OVER MAXIMUM PREVIOUS VALUES AT CURRENT STAGE OF CYCLE.

In response to numerous requests, we are reprinting herewith a chart originally prepared by Robert Geisinger of Montgomery Ward and Company. This chart shows price behavior during and following major war periods. It has been posted through February 1952.

The new figures, from the Survey of Current Business, are as follows:

1951	
Jan	180.1
Feb	183.6
Mar	184.0
Apr	183.6
May	182.9
Jun	181.7
Jul	179.4
Aug	178.0
Sep	177.6
Oct	178.1
Nov	178.3
Dec	177.8
1952	
Jan	176.7
Feb	175.6

MR. BURNETT BECOMES A DIRECTOR

You will be glad to know that Mr. Verne Burnett, partner in the firm of Verne Burnett Associates of 522 Fifth Avenue, New York City, which has been handling our public relations and publicity for the past year, has become a number of the board of directors of the Foundation.

Mr. Burnett is a graduate of the University of Michigan, class of 1917.

After working as a magazine and newspaper editor, he served General Motors in publicity and advertising work for nine years.

Later he was public relations vice president for General Foods Corporation for 12 years.

He started his own public relations firm in 1944, guiding public, stockholder, employe, and community relations and/or publicity programs for corporations in such fields as food, drugs, detergents, chemicals, electrical appliances, landscaping, insurance, railroads, publications, radio and television. He has worked with scientific, educational, and charitable institutions and several trade associations.

He has been a vice president of the Association of National Advertisers, a director of the Public Relations Society of America, and of the Audit Bureau of Circulations. He is a director of the American Arbitration Association.

He is author of the book, **You and Your Public**, and numerous magazine articles.

His new book, **Solving Public Relations Problems**, is to be on sale in May.

Mr. Burnett brings to the Foundation a keen mind and a sense of balance always needed in a specialized activity such as ours.

Mr. Verne E. Burnett

FREE SUNSPOT INFORMATION

Members who are interested to keep up to date on sunspot behavior are invited to send their names and addresses to Mr. Neal J. Heines, President, Solar Division, American Association of Variable Star Observers, P. O. Box 2353, Paterson, New Jersey.

Mr. Heines will put such members on the list to receive, without charge, the Solar Division Bulletin which is issued once a month. The Bulletin gives notes and news, statistics, predictions of sunspot numbers, new publications, etc.

If you do not know for certain whether you want to be put on the list, why not send for a sample Bulletin?

READERS' REACTIONS

SEVENTY-TWO of you were good enough to take the time to fill out and return the questionnaire printed at the end of the November report.

Here is how you answered:

*

As for style, one person found it too simplified, eight found it too technical, and 56 reported that it was about right.

*

Two of you did not like the new cover, but 65 of you did. Some of the comments were as follows:

Lombard, Illinois: "Use lighter colored paper. I make note of most interesting and significant pages and articles on the cover, for quick and ready reference."

Schenectady, New York: "Cover too dark; cannot read printing."

Bakersfield, California: 'Too formal—Give it utility—Picture—Current Cycle."

Camden, Maine: 'What's it matter?"

We have made the blue somewhat lighter and clearer. If you want further changes let me know.

*

One man did not like the little summaries at the beginning of each article, but 67 of you did, so I guess they stay.

*

I was surprised to see how many liked the little book reviews. The vote was 58 to four in favor of them. A man from Cleveland said, 'Would like a larger **Additions to the Library** section—reviewing books in the field even though they may not be added to your library."

*

The inclusion of pictures did not meet with much uninimity. Twenty-seven people wanted them continued more or less as at present, but 17 people asked to have them discontinued, and 15 people wanted their use increased. Remarks were as follows:

Grand Rapids: 'Pictures waste space."

Wethersfield, Connecticut: "Don't overdo it."

Omaha: "Don't stretch for them. Keep them appropriate."

Boston: 'I like them, but why bother."

Chicago: "If you did not use the pictures, could you fill with text? I would prefer it all meat if you have enough to fill."

Woodland Hills, Calufornia: "Yes, small ones in reasonable numbers, if they do not increase publication expense too much."

Boston: "Yes, provided they do not curtail the text."

Newtonville, Massachusetts: 'Continue but not to the point of omitting more important data or charts."

Montreal, Canada: 'A few are effective, especially with concise explanation."

*

Fifty-three of you asked for a glossary as against seven who did not want one. A glossary it shall be, as soon as I can prepare it.

*

Thirty-four percent of you would be just as happy if we cut down the number of pages a little; 22% would be suited just as well with a report every other month. I sense that what you want is quality, not quantity. In line with this idea I have cut the number of pages a trifle, and am trying to make them better, more interesting, and more to the point.

*

Nearly a quarter of you reported yourselves interested in **all** aspects of natural and social science. This breadth of interest surprised me somewhat.

The rate in percentages was as follows:

Astronomy	35	Geomagnetism	29
Astrophysics	28	Geophysics	26
Agronomy	29	Herpetology	25
Anthropology	28	History	50
Archaeology	29	War	51
Bacteriology	26	Hydrology	25
Biology	29	Limnology	25
Botany	28	Mammalogy	25
Climatology	53	Medicine	39
Dendrochronology	25	Oceanography	29
Economics	64	Ornithology	26
Build. Constr.	51	Paleontology	25
Real Estate	65	Physics	35
Production	58	Physiology	31
Commodity Pr.	72	Psychology	49
Security Pr.	88	Seismology	32
Entomology	25	Sociology	39
Forestry	32	Volcanology	26
Geology	35	Zoology	24

*

Four percent of you did not answer the question which asked the departments you liked. Of the 96% who did answer, the results, in percentages, are as follows:

Director's Letter	84
Research	84
Technical	36
Questions and Answers	65
Letters	62
Data	38
Addition to the Library	49
Miscellaneous	28
Foundation Affaire	44
List of New Members	26
Ancient Cycles	41
Reprints	44
Basic Data Bulletins	33
Technical Bulletins	32
Index at year end	42

I was quite surprised—and of course no end gratified—that so many of you liked the Director's Letter. I was also glad to see the wide interest in the other departments. And even in those instances where a universal interest was not expressed, 59% of you voted in favor of keeping the other departments.

*

Many of you made helpful comments, some of which read as follows:

Hollywood: "[Print] additional description of methods used in analysis and **reasons** for method selection."

Hamilton, Ontario: "In spite of college education, I, and most others, have forgotten much we have learned. It requires too much mental effort to get the meat. After one is away from academic work for many years he soon forgets even the most elementary knowledge you expect him to have. This can be overcome by a little summary but it must be darned simple to please 'softened intelectuals'."

Grand Rapids: "Suggest conclusions definitely expressed with special heading or type."

Lombard, Illinois: "Research articles just right. Technical articles tedious. In latter I suggest fewer technical terms, but explain these few."

Cisco, Texas: "Would like to see more technical information on such things as Hoskin's Time Chart and section moving averages, etc."

Red Bluff, California: "Technical Section too technical. Leave out Technical or have a special technical issue to those interested."

Denver: "Very interesting as is, Technical Section especially, explained very clearly."

Montreal, Canada: "Shall answer in a couple of years, if all goes well."

Chicago: "[Add] life cycles—lunar influence on tides—gravitation."

Tarrytown, New York: "[Print] an article, please, on how to determine a trend line; an article, please, on how to remove trend; an article, please, on the 1, 2, 3 steps in examining one's own raw data. (Example: (a) Verify accuracy of raw data (b) determine trend (c) remove trend (d) prepare periodic table (e) select moving average length (f) compute moving average (g) compare deviations, etc., etc."

Santa Ana, California: "Would like to see up to date chart additions from time to time—say every 6 months—on previously printed charts. These could be narrow strips (of necessity) which could be pasted on the previous charts."

Hollywood: "Directory of members and addresses."

Peoria: "Critical comments on the work of other current cycle 'ites'."

Boston: "Charts are illegible; should show legend at top as well as bottom. Hard to pick out dates."

Chula Vista, California: "Sources of basic data would be useful."

San Antonio, Texas: "[Go] into more minute detail in the technical section. Need more articles by contributors."

Darlington, South Carolina: "More Cotton and Stocks."

Schenectady, New York: "Statistics on membership."

New York City: "Letters could be incorporated with Questions and Answers."

Bakersfield, California: "[Add] short term cycles—3-day, 3-weeks, 6-weeks, fast action, 10 weeks and seasonal on prices, stock, commodity, futures.

Oakland, California: "Where one graph or cycle refers to another or basic graph, why not use medical book technique—overprint the cycles on onionskin paper—or show the cycle by a dotted line within the basic."

Oklahoma City: "[Add] wheat, corn and cotton."

Darlington, South Carolina: "[Add] cotton and stocks."

We will adopt as many of these suggestions as possible.

Letters

The Dewey vs. the Predix Projections

Dear Mr. Dewey:

. . . . I wish to ask one question. I have before me Mr. Vedder Hughey's PREDIX, just received. I do not have with me at the moment your prediction of the stock market movement of the present but I believe your chart based on many cycles shows that at the present we may expect a rising market. Predix shows a dropping market at the moment.

Now I realize that you both state that your predictions should be read "plus or minus 6 months." Even so, I would imagine that both of you would arrive at substantially the same conclusions, using almost identical cycles.

Am I right that your predictions do differ with Predix or did I read something wrong?

Very truly yours,
Frank W. Satterthwaite
Wyomissing, Pennsylvania.

My Answer

Dear Mr. Satterthwaite:

In answer to your letter, Mr. Hughey was bold enough to say that his forecast should be read plus or minus six months. I never stuck my neck out that far. In fact I never stuck it out at all because I have never expressed any opinion in regard to the significance of the cycles that I used in connection with the June 1951 projection.

To the contrary, I have said that they were purely preliminary and published merely to show how a number of other cycles, if real, could easily combine in such a way as to upset completely the 9.2-year cycle upon which I reported in that issue.

I went even further and compared the projection with a wood and plaster mock-up of a design for a new automobile. Nobody would expect a mock-up to run; my projection published in the June 1951 report should not be expected to "run" either. In fact I expressed amazement that it had turned out pretty well over the past seven years.

However, assuming the most unlikely circumstance that all of the cycles I discovered were real and will continue, and assuming that there are not other cycles in the stock market, there is nothing in my projection (which goes along about level for three or four years) to interfere with a **very important** up-turn **or** down-turn that could come about either as a result of accidental forces or short-term cycles.

In other words, there is no reason at all why over any short period of time—let us say three or four years—my projection and Mr. Hughey's projection should agree.

Mr. Hughey's projection could be right, and mine could be right too, as far as it goes. However, I hold no brief for mine being right, except to illustrate principles. My projection is not intended as something on which to buy or sell stocks. Mr. Hughey is not giving any advice in regard to the purchase or sale of securities either. He is merely telling you what he has found in his work up to date. These findings may be justified by future events or they may not; or some of them may be justified and others may not.

I want to repeat what I have said a number of times in print and many times orally that in my opinion the way to make money with cycles in the stock market is to determine some short-term cycles that have repeated themselves so often and over so long a period of time that they cannot reasonably be the result of chance, and then to play these short-term cycles on an actuarial basis, expecting losses and runs of losses, but expecting—or at least hoping—that on the average and in the long run the gains will exceed the losses just as they do in fire insurance.

Very cordially yours,

Some Very Good Questions

Dear Mr. Dewey:

I feel that it is about time I wrote to express my appreciation and interest in your studies of the composition of stock market cycles, and perhaps to ask a question or two which your discussions have suggested.

As an amateur and none too successful student of the market, I attempted about four years ago to combine and project the 41-month, 9 1/5-year, and 18 1/3-year market cycles, timed as shown in "Cycles — the Science of Prediction." Needless to say, it was a pretty crude attempt, using only three cycles, with no knowledge of how to weight the effect of each in the synthesis. At that time I felt that only those cycles which have some resemblance to the major fluctuations in the raw data could be of any practical use to a layman for forecasting purposes, and that other alleged rhythms, whose presence could only be demonstrated by statistical manipulation of the basic data, were only of academic interest. However, the discussions which you have presented in the Monthly Reports have cleared up this point, and ably demonstrate the need to isolate the obscure as well as the more apparent rhythms before attempting a synthesis. I still have some lingering doubts however as to the reality of **all** of the many market cycles which may be indicated by statistical or harmonic analysis, for is it not true that one may inadvertently inject (by means of the method used) and subsequently detect, to some degree at least, the presence of cycles of almost any length? Perhaps this is what you mean when you caution readers concerning the reality of some rhythms.

The Reports have discussed the means by which cycles of different amplitudes, when plotted to a common vertical scale, may be synthetized to show their combined effect in a single curve, but I do not recall that I have seen explained how it is possible to measure the relative strength or amplitude of the individual cycles in a time series which have been isolated by analysis. To obtain an accurate synthesis, accuracy in measuring the amplitudes of the component cycles must be almost as important as the determination of their wave lengths and timing.

The idea of synthesis of all known market cycles and projection of the synthetic curve appeals to me as the most practical use that can be made of cycles in market forecasting. On the subject of synthesis, however, you frequently remark that almost any curve may be reproduced if enough regular waves of the right shape, length, amplitude and timing are employed, and hence the correspondence of a synthesis to the original curve has little significance. It is easy enough to see that the value of a projection of such a synthesis is contingent upon the accuracy of the analysis and synthesis, the reality of the component cycles and their continuance, but why isn't the correspondence of the synthesis with the original curve a good measure of the **accuracy** with which the work was done? Is it because the close correspondence of the two does not prove the **reality** of the component waves, but only proves that the mathematics were correct? Even so, my limited knowledge of the subject leads me to argue that it is results that count, and if the synthesis conforms closely to the historical curve, its projection into the future should conform equally well as long as the constituent cycles continue, and barring of course the introduction of new elements not contained in the basic data. Because of these provisos, and also because of the cumulative effect of errors in timing and wave length, I would not have much confidence in a projection carried very far into the future. That however should not be necessary, for a reasonably close projection a year or two ahead would be ample for an investor's purpose. This would require recalculation of the analysis and synthesis each year or two to reflect the price indexes of the added years.

This question of the reality of cycles appears to raise an even tougher question: even when proven "real", are cycles continuous in their effects, or may they wax and wane in strength, or disappear entirely and now ones take their place. Perhaps uncertainly on this point is a basic difficulty in cycle analysis of stock prices.

We don't hear much of the 41-month cycle any more, probably because it has apparently failed us in the last five years, as it has in other periods, notably during the twenties and early thirties. I will be curious to see what effect inclusion of the 41-month and other short cycles will have on your preliminary synthesis as published on pages 220-221 of the June 1951 report. Perhaps if the work had included the 41-month cycle, the correspondence of the synthesis with actual prices would have been closer for the period roughly from 1897 to 1923, when the 41-month cycle clicked very well. On the other hand the great bull and bear markets of the twenties and early thirties might not have been reproduced so closely if the 41-month had been included, and neither would the projection of the market from 1946 to date have come so close to actuality, because the action of the 41-month wave was weak and obscure in both those periods.

Cordially yours,
Howard R. Sherman
Boston, Massachusetts.

In answer I wrote as follows:

Dear Mr. Sherman:

I fully share your doubts as to the reality of many of the cycles that have been indicated by various methods of analysis.

I do not think it is likely that the methods used inadvertently inject cycles but, by various groupings of numbers, the methods often emphasize cycles which are present merely as the result of random forces, or detect cycles which are combinations of other cycles and which therefore cannot be expected to continue.

The matter of determining the average amplitude of a cycle is quite easy. If in a series of figures you have a 9-month cycle and you write down the first 9 figures in a line and under them the next 9 figures in another line and under that the next 9 figures in another line, and so on, all the crests of the 9-month cycle will fall under each other, even if you do not know in advance where the crest is going to be.

If you then average each of the 9 columns the average wave will be disclosed and you will also have the average amplitude.

There are various refinements but this is the main idea.

In connection with the correspondence between a combination of cycles and the original curve you are absolutely right that the correspondence merely proves that the arithmetic was correct.

Let me give you an analogy to illustrate what I mean. Suppose you had a series of 8" bricks laid end to end, but could see only the first three bricks, the length of which would be 24". Suppose further that the cracks between the bricks were filled in so cleverly that you could not see them. You might then suppose with equal justification that the 24" were made up of two 12" bricks, three 8" bricks, or six 4" bricks and so forth.

Two 12" bricks would explain perfectly the 24" cleavage but there would not be a cleavage 12" further along the wall.

You cannot apply this analogy too closely but it should give you the idea.

If you take all the harmonics of a series of figures 201 years long you will reproduce the curve exactly. But when you project these harmonics into the future all you will get will be the curve repeated. You could get the same result just as easily by taking a photostat of the original curve and pasting it on where the first curve left off. In other words, pure harmonic analysis is merely description and has no forecasting value. This is because the cycles used are merely mathematical building blocks and have no necessary relation to reality.

You have the crux of it when you say the projection into the future should conform equally well as long as the constituent cycles continue. The point is, you can reproduce a curve exactly by combining constituent cycles that are not real and will not continue.

In your comment that cycles do not have to be projected very far into the future you have something of significance in connection with "compound cycles."

I use the term compound cycles to mean a cycle caused by two other cycles one slightly longer and one slightly shorter which, over a short period of time, combine to look like a cycle midway between the two. Such cycles often continue over fairly long periods of time and therefore the odds at any given moment favor their continuation, even though ultimately they gradually fade out and then reverse.

You ask if cycles are continuous in their effect or if they wax and wane.

When I see a cycle that waxes and wanes, such as the 41-month cycle, I suspect the possibility of a compound cycle; but this is not necessarily the case. Cycles of different length doubtless have different causes. Some cycles might wax and wane in amplitude, others might wax and wane in length, and others might be uniformly constant. I can think of examples of all sorts. A woman's chief emotional cycle for example seems to have a constant period of 14 days but waxes in amplitude or intensity from adolescence into adulthood and wanes in intensity from middle to old age. The rhythmic pains of childbirth change their length or period from half hour intervals down to intervals of a minute or so, at the same time increasing in-in intensity up to a point and then decreasing. Ripples in a pond decrease in amplitude as they radiate from the stone thrown into the water.

In connection with your comments on the 41-month cycle, since your letter was written you have doubtless received articles on this subject in the November and in the December report.

Mr. Vedder Hughey has made a synthesis of many stock market cycles including the 41-month cycle. If this subject interests you you can buy his report by sending $10 to him at 2685 Southwest 25th Street, Miami, Florida or you can get a copy by extending your own subscription for a year and either digging up a new member for the Foundation or sending in a gift subscription, but perhaps you have already done this. Thanks again for your letter.

Very cordially yours,

Some Interesting Suggestions

Dear Mr. Dewey:

Enclosed is the readership survey questionnaire. As an additional comment, I think that it would be better to use expert judgment, such as your own, rather than general popularity as a method of choosing subjects most fruitful for cycle analysis.

While writing, I would like to mention several ideas that have occurred to me while thinking about cycles.

1. According to du Nuoy ("Biological Time"), "time" has different values for people of different ages. A day is relatively longer to a three year old child than to a thirty year old man etc. This factor might also show up in the life of a nation or a business and might also show up in the cycles thereof. You mentioned some time ago that some cycles seem to be shorter now than they used to be.

2. I am not an astrologer and know nothing about the subject, but it seems to me that some astronomical cycles might be found that would be analogous to earthly cycles. I believe this has been done in one case already. It might be possible to explore astrological books for cycles in a manner similar to that in which old herb remedies are investigated for sources of pharmaceutical chemicals.

3. If cycle analysis results in reasonably accurate forecasts of future market cycles, and if this becomes widely known, this knowledge itself will probably have considerable effect on future cycles. I am not sure, but I believe that the general effect would be to decrease the amplitude of the cycles.

4. If it would be possible to find several cycles of the same pattern but occurring at some distance apart in time, the earlier one could be used as a prediction of the later one. For instance, if rural real estate values fluctuate the same way as urban values, but six months earlier, then the rural value could be used as a short-term prediction of the urban value. Such a combination of market price patterns, if it could be found, would be of great value to a speculator in stocks or commodities. (Let me know PDQ if you find one.)

I am very interested in the subject of cycles and feel that I am "in" on the birth of a science. Although my available time and my mathematical ability are both very limited, if there is any computational, analytical, tabulative, or other work that you would like done but have no time for, I would be glad to try to help out to the extent of about four hours per week. I believe I could obtain the use of a Friden calculating machine.

Thanks a lot for all the very interesting articles in "Cycles".

Very sincerely,
Karl E. Balliet

Bedford, Virginia.

My Answer

Dear Mr. Balliet:

I am deeply appreciative of your offer to contribute perhaps four hours a week of computational work. If you lived across the street we could use this assistance to very great advantage. But I am afraid that the time required to outline what needs to be done in any given instance would pretty much eat up the "profit". However, on some fairly long job it might be possible to take advantage of your kindness. I shall keep the matter in mind and let you hear from me if anything of this sort develops.

(1) In answer to your various points it is quite possible that some cycles change their length over a period of time. From the standpoint of forecasting this fact would introduce no complications if the change in length took place according to some fixed pattern.

On the other hand, if one allows oneself the latitude of changing lengths, it becomes much easier to fit cycles to random numbers; that is, to discover cycles that have no significance. I think unless the evidence for changing length is very clear we would all do better in the present state of our knowledge to limit ourselves to cycles of fixed length.

(2) I agree with you about the desirability of winnowing folklore in the hope of coming up with facts of value. Like yourself, I know very little about astrology but I believe that many of the cycles believed to have significance are the time intervals between successive conjunction of the various planets, or simple fractions of thesr lengths.

In our April 1951 issue I published the various synodic periods of all the planets. I find it interesting to compare these lengths and their fractions and wave lengths discovered here on earth.

There are some correspondences. For the most part however the wave lengths in the two sets of figures do not match up. That is, most terrestrial cycles do not correspond to the synodic periods or their fractions. Most of the synodic periods and their fractions have no yet-discovered counterpart here on earth.

(3) I agree with you that if market cycles are widely known and acted upon the general effect would be to decrease the amplitude of the cycles. This may be what has happened to the 41-month cycle which has been of almost insignificant importance in the market since it became well publicized about 12 years ago.

(4) You are quite right that if two time series behave the same way, but with one of them lagging the other, the one with the earlier turning points is of important forecasting value. The trouble with this method of forecasting is, however, (a) the difficulty of finding such series of figures, (b) the difficulty of being sure that this correspondence of behavior will continue.

Thank you again for your offer of cooperation. Maybe sometime I will surprise you by taking you up on it.

Very cordially your,

First Reference to 41-Month Cycle

Dear Mr. Dewey:

I am enjoying the publications of the Foundation a great deal, especially your articles on the "41-month cycle." You will be interested to know that Herbert Stanley Jevons (William S. Jevons' son) was the first, as far as I know, to refer to this cycle in U.S. economic phenomena. This was an article written in 1909 in "Contemporary Review" (reprinted in 1910 as a pamphlet under the title "THE SUN'S HEAT AND TRADE ACTIVITY") 14 years before Kitchin and Crum.

As far as I know, Herbert S. Jevons is still alive (though probably in his 90's) and I am sure he would appreciate reprints of your articles.

Sincerely yours,
Carlos Garcia-Mata

Questions and Answers

Question. Does a trend ever take on the same pattern as a periodic cycle?

Answer. Yes, occasionally.

Sometimes an industry or a company grows rapidly over a period of years and then is confronted by circumstances that cause a more or less corresponding decline.

The underlying growth trend of such a company or such an industry might resemble one single wave of a long cycle.

Question. Is there a limit to the projection of an established business trend?

Answer. If you have found all of the cycles that operate in the business, the residue will be the accidental variations and the underlying growth trend. The characteristics of this underlying growth trend can be determined. If you assume that these characteristics will continue you can project the trend as far as you wish into the future. The great trouble is that you probably cannot detect all of the cycles and, of course, you cannot know of accidental and non-cyclic factors that will enter into the picture in the future. Moreover, even the characteristics of the growth trend may change.

The result of all this is that the farther you project the trend into the future the greater the probability of error.

On the other hand, trend projections used with intelligence and revised frequently can be of great assistance.

Question. What aids in long run planning are available to the business man who attempts the introduction of a totally new and unrelated product?

Answer. If the new product is really something completely new, there is no way of knowing what the cycles will be.

However, if the product has been made previously by other manufacturers, he can often get back figures from the Survey of Current Business, or the trade association involved, and see the cycles that are present in the other fellow's sales.

Question. What are some causes of economic cycles?

Answer. The answer to this question depends upon just what you mean by the word "cycle."

If you mean merely the increase of business activity or prices from low levels to high levels and the ensuing decline back to low levels again you will find hundreds of books and articles in which the authors argue ad nauseam about what caused this or that particular cycle.

If, on the other hand, you used the word cycle to mean rhythmic or regularly recurring cycles the answer is equally unsatisfactory because nobody yet knows why certain cycles are rhythmic.

Some cycles may recur at reasonably regular time intervals merely as the result of random forces which happen to come at these intervals. In this connection, see an article in the January 1952 report called "Cycles in Random Numbers."

If the regularity is not due to accident it must have a cause. Some people believe that this cause is climatic.

The late professor Huntington of Yale believed that the cause of at least some of the cycles is electrical. In this connection, refer to an article in the present report on page 130.

The whole subject is clouded in mystery on which the Foundation for the Study of Cycles is trying to throw a little light. Regardless of cause, however, if any of the regularly recurring cycles are not mere accidental regularities it should be obvious that any theory of cause and effect that fails to take the fact of this regularity into account may be in error.

Question. With the ever increasing controlled economy, won't the predicting of future trends based on past cycles be more difficult than at any time in the past?

Answer. I should think so, but the more difficult the thing is the greater the challenge and also the greater the need.

Additions to the Library

"Music History in Five Five-Hundred-Year Cycles," by Warren Dwight Allen, from the **Journal of Human Ecology**, Vol. 1, No. 13, 1951, 41 pages. Gift of the Weather Science Foundation.

Dr. Allen, Professor emeritus of Stamford University, observes that "the changing trends in music history are definitely related, [or] at least amazingly comparable to, the cyclic fluctuations in climatic history." His "researches showed secular trends [in music] which corresponded with Wheeler's 100-year cycles [in climate] and which fitted into the larger cycles of 500 and 1000 years each."

"The five great 500-year cycles [in music], each beginning and ending in cold-dry years, with the emergence of definitely new musical styles and habits, are **approximately** as follows:

I	576 B.C.	-	30 A.D.
II	30 A.D.	-	460 A.D.
III	460 A.D.	-	960 A.D.
IV	960 A.D.	-	1475 A.D.
V	1475 A.D.	-	1980 A.D. ?

In his 41-page paper Dr. Allen explains in detail the "exciting changes" in musical styles and habits which took place at these times.

● ● ●

"Cloud Seeding" by Bernard Vonnegut, printed in the **Scientific American** for January 1952, Vol. 186, No. 1. Five pages, one chart, four pictures.

Dr. Vonnegut is a physical chemist in the G.E. research laboratory and is the man who first suggested the use of silver iodide for cloud seeding.

This article tells, among other things, of an experimental use of cycles by Irving Langmuir of the General Electric Research Laboratory in connection with his cloud seeding activities. In Dr. Vonnegut's own words,

"It was decided to set up a regular seeding schedule in New Mexico to determine whether seedings carried out at regular intervals would result in corresponding periodicities in rainfall downwind from the generator. The generator was operated on Tuesday, Wednesday and Thursday of each week. Checking with data on precipitation from the U.S. Weather Bureau, Langmuir soon began to observe a marked weekly rhythm in the rainfall, not only in the region near the seeding but in a broad band through most of the Midwest and into the Eastern states. The records of the Weather Bureau showed no previous instance of a similar periodicity. Langmuir also found an even more striking rhythm of changes in temperature and barometric pressure in the region. His careful statistical analysis indicated that this single silver-iodide smoke-generator produced a large effect on the weather over about one third of the U.S."

This use of cycles by Langmuir illustrates two basic principles of cycle study. One, where we have cyclic behavior too regular to be the result of random forces, we have the right to assume a cyclic cause; and two, where two phenomena fluctuate in cycles of exactly the same length, we have a suggestion of possible interrelationship.

● ● ●

"Long Term Weather Cycles and Their Causes," by Sydney Makepeace Wood, reprinted from **The Illinois Engineer** of March 1949, Vol. XXV, No. 3. Fifteen pages, seven figures. Gift of the author.

This article charts repetitive patterns of 46 to 47 years in average flood stages of the Mississippi River, of 33 to 34 years in Chicago rainfall, of 46 to 48 years in sunspots and Chicago temperature, and of 89 years in sunspots.

Wood also attaches importance to repetitive patterns of 178 years and 737 or 738 years.

He believes that solar changes directly affect our weather and are the underlying fundamental cause of floods, droughts, and other violent meteorological phenomena, and that the gravitational or tidal pull of the planets is a primary cause in the formation of sunspots and prominences.

* * *

"My Grandfather, Peter Cooper," by Edward R. Hewitt, condensed from "Those Were the Days," **Reader's Digest**, January 1952.

This article contains the following paragraph of interest to cycle students:

"Grandfather figured on a business panic about every ten years. To be prepared, he always kept a large supply of gold on hand. When, in his estimation, the bottom of the financial crisis had been reached, he would put all the gold into his gig, drive to Wall Street and buy the best securities at low prices. He did this so many times that, when he and his gig appeared in Wall Street during a panic, the word went up and down that the storm must be over because Peter Cooper was buying securities."

* * *

Linear Computations, by Paul S. Dwyer, John Wiley & Sons, New York, 1951. 344 pages, numerous tables, references, exercises. Gift of Mr. Vedder Hughey.

* * *

"Tree Rings and Sunspots," by J. H. Rush, printed in the **Scientific American** for January 1952, Vol. 186, No. 1. Five pages, four photographs.

J. H. Rush is a physicist at the High Altitude Observatory of Harvard University and the University of Colorado.

This article concerns itself chiefly with the tree ring dating work of A. E. Douglass of the University of Arizona. In 1901 Douglass, then assistant astronomer at the Lowell Observatory, first studied tree ring widths—which are available over long periods of years and which seem to be associated with sunspots— in an effort to throw light on probable solar activity prior to the time when systematic observations of sunspots were first commenced.

* * *

"The Solar Faculae," by H. B. Rumrill, reprinted from **Popular Astronomy**, Vol. LIX, No. 7, August 1951, four pages. Gift of Neal J. Heines.

Although there is nothing about cycles in this paper, the cycle student wants all the information he can get about solar faculae and all other varying solar phenomena.

* * *

"The Cathode Ray Sound Spectroscope," by K. H. Davis, as printed in the **Bell Laboratories Record** for June 1950, pp.263-267. Four figures.

The techniques and devices of the sound engineer are always of interest to the student of longer cycles. This article describes a machine for analyzing speech sound into spectrograms showing amplitude versus frequency and for recording the results of the analysis. One of these spectrograms is shown herewith.

K. H. Davis is a member of the Technical Staff of the Transmission Research Department of the Bell Telephone Laboratories.

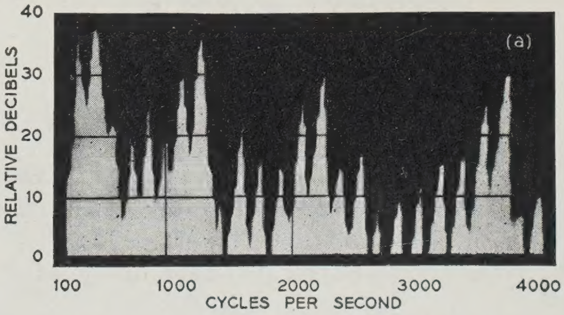


Fig. 1a—A typical record of amplitude versus frequency analysis of speech sound.

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